THE TECHNOLOGICAL MUSEUM OF NEW SOUTH WALES,
SYDNEY.

THE USEFUL NATIVE PLANTS OF AUSTRALIA,

(INCLUDING TASMANIA)

BY

J. H. MAIDEN, F.L.S., F.C.S., &c.,
CURATOR OF THE MUSEUM.

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USEFUL NATIVE PLANTS OF AUSTRALIA.

THE TECHNOLOGICAL, INDUSTRIAL, AND SANITARY MUSEUM OF NEW SOUTH WALES.

FOUNDED 1880.

Committee of Management.

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THIS MUSEUM, which already contains over 25,000 specimens, is intended to occupy a similar position and fulfil the same purpose in this Colony, which the South Kensington Museum, the Bethnal Green Museum, the Museum of Practical Geology, the Patent Office Museum, and the Parkes Museum of Hygiene do in London.

A complete synopsis of the Museum would be too voluminous; the following notes will, however, probably give some idea of the scope of it.

1. ANIMAL PRODUCTS (exclusive of foods) and specimens to show the methods followed in their preparation and manufacture. PRODUCTS of (*a*) MAMMALIA.—Wool, hair and bristles, horn, hides, skins and leather, furs, bones and ivory, oils, fats and perfumes. (*b*) BIRDS.—Feathers, down, birdskins, eggs, oil and fat. (*c*) FISHERIES.—Sponge, coral, pearls, shells, fish-oil, furs, whale-bone; fish culture and apparatus. (*d*) REPTILIA.—Tortoise shell.

1A. ECONOMIC ENTOMOLOGY.—The specimens are arranged so as to enable the public to discriminate between insects which are injurious to man and those who work for his benefit; and show their life history and specimens of the materials which they have destroyed or injured. Insect ornaments. Insects used in medicine and dyeing. Silk-worm, honey bee, &c.

2. Vegetable Products, from the raw material through the various stages of manufacture to the finished fabric or other article. This section includes gums, resins, oils, woods, fibres, tans, dyes, drugs, perfumes. Forestry and forest products.

3. Waste Products, whether of animal, vegetable, or of inorganic origin, with illustrations of their utilization.

4. Foods, animal and vegetable, their constituents, and illustrations of their adulterations. Dietary tables and information concerning the chemical composition and other important particulars regarding the human foods of the world.

5. Economic Geology.—Metallic ores. Building and ornamental stones. Mineral combustibles. Lime, cement and hydraulic cement, raw and burned. Artificial stone. Clays, kaolin, silica, and other materials for manufacture of pottery, glass, &c. Refractory materials. Substances used for grinding and polishing; pigments of inorganic origin. Collections of minerals, rocks, and fossils, to illustrate well-known text-books. Collections of minerals to illustrate physical properties, *e.g.*, colour, lustre, diaphaneity. Woven fabrics of mineral origin (*e.g.*, wire-cloth, asbestos-cloth).

5A. Ceramics, Pottery, Porcelain.—Bricks, drain-tiles, terra cotta, architectural pottery; fire-clay goods, crucibles, pots, furnaces, chemical stoneware; tiles for ornament, pavements, roofing, &c.; earthenware, stoneware, art pottery and porcelain.

5B. Glass.—Glass used for construction and for mirrors, window-glass, plate-glass—rough ground and polished, toughened glass, chemical and pharmaceutical glassware, decorative glassware.

6. Original Specimens of Artistic Workmanship in wood, metal, and other substances. Coins and medals.

7. Photographs, Electrotype, Plaster, and other reproductions of examples of art workmanship where originals are not to be obtained.

8. Ethnological Specimens.—Musical instruments, national costumes, historical costumes, lace and embroidery.

9. Metallurgy.—Metals in a crude and refined state, with specimens illustrating the various stages of production; also samples of products of working alloys. Products of washing and refining precious metals. Electro-metallurgy. Products of the working of metals (rough-castings, wrought-iron, &c.) Manufactured metals (blacksmiths' work, wheels and tires, &c.) Wire drawing—Needles, pins, &c.

10. Mine Engineering.—Boring and drilling rocks, &c.; construction of shafts, &c.; hoisting; pumping and draining; ventilating; hydraulic mining; quarrying; models of mines, veins, &c; geological maps, sections, and plans of gold and other fields.

11. Specimens illustrative of the Mechanical Properties of various kinds and qualities of structural materials.

12. Military and Naval Armaments, Ordnance, Fire-arms, and Hunting apparatus. Military small arms, muskets, pistols, and magazine guns, with their ammunition. Light artillery, compound guns, machine guns, mitrailleuses, &c. Heavy ordnance and its accessories. Knives, swords, spears and dirks. Fire-arms and other implements used for sporting and hunting. Traps for game, birds, vermin, &c.

13. Naval Architecture, &c. Railway apparatus. Ærial, pneumatic, and water transportation.

14. Agriculture. Agricultural tools, appliances, and machinery; also soils, manures, &c. In this section will be included mineral fertilizing substances, *e.g.*, gypsum, phosphate of lime, marls, shells, coprolities, &c., not manufactured. Specimens to illustrate the life-history of animals useful to man.

15. Instruments of precision and apparatus for observations, research, experiment, and illustration. Instruments for physical diagnosis. Surgical instruments and appliances, with dressings. Dental instruments and appliances.

16. Sanitary Conditions, Appliances, and Regulations. Industrial designs. Domestic architecture and building construction. Architectural designs in general. Decoration of interior of

buildings. Vehicles and appliances for the transportation of the sick and wounded during peace and war, on shore or at sea. Apparatus for heating and lighting. Apparatus used for cooking. Laundry appliances. Bath-room and water-closet. Manufactured parts of buildings (sashes, &c.)

17. Educational.—Arrangements, furniture, appliances, and modes of training of Kindergarten, schools, colleges, professional and technical schools, institutions for deaf, dumb, blind, etc.

18. Chemical and Pharmaceutical Products.—Organic and inorganic preparations which are put to some useful purpose.

19. Models, Drawings, and Descriptions of Patents: Special attention is paid to those which are likely to prove of use in the Colonies, or which have been taken out in Australia.

20. Exhibition Catalogues, Trade Journals, Price Lists, and descriptions of new processes or industries. The information afforded to manufacturers, merchants, and tradesmen by a collection of this kind is of great value.

Series of specimens illustrating all the stages of a manufactured article are especially desired. Loans of suitable exhibits (removable at pleasure) are also received, and the Committee undertakes to take especial care of such, and to insure them against fire.

Sufficient concise information is attached to each exhibit or group to satisfy without wearying the visitor; a full description will be given in the catalogues. The prices paid for specimens and their commercial value is indicated wherever possible. The cost or value of gifts is not affixed where donors express wishes to the contrary.

J. H. MAIDEN,
Curator and Secretary.

PREFACE.

THIS book originated in a catalogue the author had prepared of such specimens obtained from plants indigenous in Australia as were in the Museum. But as the work proceeded new specimens continued to arrive, and as it was found that the catalogue would, for that reason alone, never be complete, he decided to extend it, so as to include all Australian plants which up to the present are known to be of economic value, or injurious to man and domestic animals.

The subdivisions of "Timbers," "Drugs," "Foods," etc., are those which from experience he has found most convenient to Museum visitors. Under each of these sections the species have been arranged in alphabetical order. The practice of subdivision into sections has the drawback of causing a certain amount of repetition, which, however, the author has endeavoured to minimise by cross references, but its many advantages are at once apparent.

At the end will be found a complete index of the whole of the botanical names (whether in use now or obsolete), and the vernacular and aboriginal names used throughout the book, together with a brief miscellaneous index. It is believed that the list of aboriginal and colonial names is the most complete which has been published up to the present time.. Wherever possible, an endeavour has been made to indicate the locality in which a vernacular name is in use, as many of them are extremely local. It will be observed that some of the colonial names are very misleading, and the matter is sometimes rendered more difficult through the same name having been given to several plants. Many of the names, as might be expected, are those of European plants Australian ones are supposed to resemble. But as the flora of the two continents are very dissimilar, difficulties in giving them common names crop up very readily. A few of the names may prove to be erroneous, especially some of those attributed to Eucalypts, but the greatest care has been exercised, while the

reprehensible practice of fitting botanical names on to vernacular ones has never been attempted by the author. He has reason, however, to suspect that this has been done in some lists of economic plants he has quoted.

The literature of Australian economic vegetable products may be said to date from the great Exhibition of 1851. But until the last few years, owing to the somewhat unsettled nomenclature of Australian plants, the properties of the same plant will be often found described under a variety of botanical names. In order to make these old books of reference conveniently available to readers, the author has found it necessary to give the synonomy of all plants referred to. The nomenclature adopted is that of the *Flora Australiensis* of Bentham and Mueller. All references to that work are denoted by "B.Fl." But the species-names have been invariably compared with the *Census of Australian Plants* of Baron Mueller (Part i. "Vasculares," printed for the Victorian Government, 1882, and with annual supplements). The references to that work are indicated by "Muell. Cens." Where no such reference is made, it denotes that the species named in the *Flora Australiensis* and the *Census* are identical. But in those cases in which the *Census* species-name differs from that in the *Flora*, a note to that effect is invariably given. In some cases the *Census* is the only authority quoted; in these instances the species has not been described in the *Flora*. In the case of some new species, the names are to be found in neither of these works, for these, suitable references are given.

The use of the learned Baron's *Census* side by side with the *Flora Australiensis*, became an absolute necessity for the following reasons. The earlier volumes of the *Flora* were published over twenty-five years ago, and during that period a large number of species have been added (almost entirely by Baron Mueller himself), the localities of plants have been confirmed or rectified, and greatly extended, and the two learned botanists have not always been unanimous as to the botanical limitation of genera and species. Further, additional information has shown that some of the names (especially in the earlier volümes) of the *Flora* required amending. The *Census* is, in part, an enlarged index and supplement to the

seven volumes of the *Flora*, and is not merely useful, but absolutely indispensable to the student of Australian plants.

The genus Eucalyptus is the only one in which any alteration of the arrangement referred to above has been made. In regard to this the author has generally adopted the nomenclature of the classical monograph, *Eucalyptographia*, of Baron Mueller (Government Printer, Melbourne, issued in ten parts, descriptive of one hundred species, from 1879 to 1884), and cross-references have been made to the *Flora Australiensis*.

Because this is not a text-book of Systematic Botany, botanical diagnoses of all kinds have been rigorously suppressed. They would be simply useless padding in a book with the aim of the present one.

Where possible the writer has quoted or embodied the reports of uninterested experts outside the colonies in regard to the adaptability of Australian raw products. Many commendations of raw products for specific uses have been made either hastily or ignorantly. It goes without saying that where such commendations have been found by manufacturers and others to be undeserved, the reputation of Australian products in general has suffered. The man who lauds a raw product must not forget the responsibility he thus takes upon himself. These remarks have impressed themselves on the author with great force in regard to the products of this new country.

The author has not confined himself to the uses to which plants, not endemic in Australia, are alone put in that continent. Doubtless the knowledge of the uses to which a plant is put in other countries of the world may lead, in some cases, to its useful employment here.

Wherever he could trace the original authors of statements, the author has made it a point of honour to acknowledge them. Of course, he is largely indebted to the works of Baron Mueller, and also to the readiness with which that distinguished botanist always assists him to disperse his difficulties. The Rev. Dr. Woolls of Sydney has recorded many useful facts in regard to the utilization of our native plants, and has also favoured the author with others. To Mr. F. M. Bailey, Government Botanist of Queensland, he is

indebted for many notes. He is much indebted to his assistant, Mr. R. T. Baker, for patient aid in revising the proofs; aid which has frequently necessitated sacrifice of his own time.

As this is the first book covering the whole of the subjects to which it refers, the author trusts it may be found useful. Many of the observations will be found to be original; some have been jotted down in his note-book during the last few years, others have been obtained from actual examination of the excellent collection of Australian products now in this Museum. While this work has been passing through the press he has obtained a mass of further information, and cordially invites correspondence on Australian economic botany.

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HUMAN FOOD AND FOOD ADJUNCTS.*

HOOKER, in his *Flora of Tasmania*, truly remarks that the products of many plants, although "eatable," are not "fit to eat," and would never be employed as food except in the direst necessity. Australian indigenous fruits, roots, leaves, and stems are nothing to boast of as eatables ; and, as in the greater part of this continent there is a very great scarcity, or even entire absence of water, an explorer can rarely traverse long distances without taking suitable food with him.

There is little doubt that most of those which are here recorded as having been utilised for food in other countries are also eaten by the omnivorous Australian aboriginal. Besides these, only those parts of certain plants have been referred to which have been recorded as having been used as food by aboriginals and colonists. Extended observations must greatly augment the list.

Knowledge in regard to the indigenous vegetable food resources of these colonies should be considered an absolute necessity by those whose avocations take them out of beaten tracks, especially in the dry country, while the ordinary citizen may find himself occasionally in a position in which an acquaintance with the scanty vegetable food products of the bush would be useful to him.

ABORIGINAL METHOD OF OBTAINING WATER.

We are indebted to the aboriginals for a method of obtaining water, and that from a source in which we should perhaps least look for it. This simple method, which had best be given in the words of those who have had much intercourse with the blacks, is now given, and no adult in Australia should be ignorant of it.

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* This section forms the substance of a paper entitled, "Australian Human Foods and Food-Adjuncts," read by the author before the Linnean Society of New South Wales, 30th May, 1888.

There is no doubt that a knowledge of this method of obtaining water would have been the means of saving the lives of many people who have suffered one of the most terrible of all deaths—death from thirst.

"It frequently happens to the natives, when out in the mallee country, that the water-holes on which they had counted on obtaining a supply of water have dried up; but they are never at a loss. They select in the small broken plains some mallee trees, which are generally found surrounding them. The right kind of trees can always be recognised by a comparative density of their foliage. A circle a few inches deep is dug with a tomahawk around the base of the tree; the roots, which run horizontally, are soon discovered. They are divided from the tree and torn up, many of them being several feet in length. They are then cut into pieces, each about nine inches long, and placed on end in a receiver, and good, clear, well-tasted water is obtained. The roots of several other trees yield water." (Dr. Grummow.) This method of obtaining water in arid regions has been described in almost similar language by many explorers.

"How the natives existed in this parched country was the question! We saw that around many trees the roots had been taken up, and we found them without the bark, and cut into short clubs, or billets, but for what purpose we could not then discover. . . . . I expressed my thirst and want of water. Looking as if they understood me, they hastened to resume their work, and I discovered that they dug up the roots for the sake of drinking the the sap. It appeared that they first cut these roots into billets, and then stripped off the bark or rind, which they sometimes chew, after which, holding up the billet, and applying one end to the mouth, they let the juice drop into it."—*Three Expeditions* (Mitchell), pp. 196 and 199.

See also a paper by Mr. K. H. Bennett, *Proc. Linn. Soc. N.S.W.*, viii., 213.

See *Eucalyptus*, *Vitis*, *Hakea*.

Aboriginal Beverages.

"The natives used also to compound liquors—perhaps after a slight fermentation to some extent intoxicating—from various

flowers, from honey, from gums, and from a kind of manna. The liquor was usually prepared in the large wooden bowls *(tarnucks)* which were to be seen at every encampment. In the flowers of a dwarf species of *Banksia* (*B. ornata*) there is a good deal of honey, and this was got out of the flowers by immersing them in water. The water thus sweetened was greedily swallowed by the natives. The drink was named *Beal* by the natives of the west of Victoria, and was much esteemed."—*Aborigines of Victoria* (R. Brough Smyth), i., 210.

See *Banksia, Grevillea, Hakea, Lambertia, Telopea.*

Sir Thomas Mitchell (*Three Expeditions*, ii., 288), speaking of an "Ironbark" near Port Phillip (Melbourne), says: "The flowers are gathered, and by steeping them a night in water the natives made a sweet beverage called 'bool.'" (Evidently the same name as that in the preceding paragraph.)

1. **Acacia aneura,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 402.

"Mulga."

In Western New South Wales two kinds of galls are commonly found on these trees. One kind is very plentiful, very astringent, and not used; but the other is less abundant, larger, succulent and edible. These latter galls are called "Mulga apples," and are said to be very welcome to the thirsty traveller.

Western Australia, through the other mainland colonies to Queensland.

2. **Acacia Bidwilli,** *Benth.*, N.O. Leguminosæ, B.Fl., ii., 420.

"Waneu," of the aboriginals of Central Queensland; "Yadthor," of those of the Cloncurry River, Northern Queensland.

"The roots of this tree are edible after baking." (Thozet.)

Queensland and Northern Australia.

3. **Acacia cibaria,** *F.v.M.*, N.O. Leguminosæ, Muell. Cens., p. 46.

"Wonuy," of the natives about Shark's Bay.

"The natives use the seeds for food." (Mueller and Forrest, *Plants Indigenous around Shark's Bay, W.A.*, 1883.)

A quantity of these seeds, obtained from near Milparinka, New South Wales, is in the Technological Museum. They are

two or three times as large as most acacia seeds (resembling small castor-oil seeds somewhat), have excessively hard and very thick coats, and what little nutritive matter they contain seems very liable to the attacks of an insect.

Western Australia and New South Wales.

4. **Acacia longifolia,** *Willd.*, var. SOPHORÆ. (Syn. *A. Sophoræ*, R. Br., *Mimosa Sophoræ*, Labill.,) N.O. Leguminosæ, B. Fl., ii., 398.

It was the "Boobyalla" of the aboriginals of Tasmania.

"The natives of Tasmania used to roast the ripening pods of this wattle, pick out the seeds and eat them." (Backhouse.) It is believed that the seeds of other species of wattle were consumed in a similar manner.

Near the coast in all the colonies except Western Australia.

5. **Acæna sanguisorbæ,** *Vahl.*, (Syn. *A. sarmentosa*, Carmich.,) N.O. Rosaceæ, B.Fl., ii., 434.

A "Burr."

The leaves of this plant have been used as a substitute for tea, and have been highly spoken of by some for this purpose.

All the colonies except Western Australia.

6. **Achras australis,** *R. Br.*, (Syn. *Sapota australis*, A.DC., *Sideroxylon australe*, Benth., and J. Hook.,) Muell. Cens., p. 92, N.O. Sapotaceæ, B.Fl., iv., 282.

"Black Apple," "Brush Apple," "Wild" or "Native Plum" of colonists. Following are some aboriginal names:—"Jerra-wa-wah," Illawarra and Brisbane Water (New South Wales); "Wycaulie," Richmond and Clarence Rivers (New South Wales); "Tchoonboy," Northern New South Wales and Southern Queensland.

The rich milky sap resembles cream in taste; the fruit is like a very large plum, but of coarse, insipid flavour.

New South Wales and Queensland.

7. **Adansonia Gregorii,** *F.v.M.*, N.O., Malvaceæ, B.Fl., i., 223.

"Sour Gourd," "Cream of Tartar" tree.

"The dry acidulous pulp of the fruit is eaten. It has an agreeable taste, like cream of tartar, and is peculiarly refreshing in the sultry climates where the tree is found. It consists of gum,

starch, sugary matter, and malic acid." (*Treasury of Botany*.) A fine figure of this tree has just been published in part 26 of the *Picturesque Atlas of Australasia*.

This species is hardly to be distinguished from the Baobab of Africa (*A. digitata*).

Northern Australia.

8. **Adenanthera pavonina,** *Linn.*, N.O. Leguminosæ, B.Fl., ii., 298, and Muell. Cens., p. 43.

"Barricarri" of India, "False Jequirity."

In India these seeds are occasionally used as an article of food. They are of the size of a kidney bean. They would doubtless require boiling, or some similar preparation, for it should be borne in mind that the Leguminosæ must be regarded as a poisonous Natural Order, in spite of the fact that it yields some of the most valuable foods used by man and beast.

Queensland.

9. **Agaricus (Psalliota) campestris,** *Linn.*, N.O. Fungi, Muell. Fragm. XI., Suppl., p. 79.

"The Common Mushroom."

This, and several other edible species of mushroom, are found in Australia. Besides the present one, no mushroom perhaps is generally used in these colonies as food. Of course the dryness of the climate renders these edible fungi much less abundant than they otherwise would be.

All the colonies except Western Australia.

10. **Aleurites moluccana,** *Willd.*, (Syn. *A. Ambinux*, Pers., *A. triloba*, Forst., *Jatropha moluccana*, Linn.,) N.O. Euphorbiaceæ, B.Fl., vi., 128. Noted in Muell. Cens., p. 20, as *A. triloba*.

"Candle Nut Tree."

The natives of the countries in which this tree grows are very fond of the nut, which is similar in flavour to the common walnut, and very wholesome. It is, however, rather rich, from the quantity of oil it contains.

Queensland.

11. **Alsophila australis,** *R.Br.*, (Syn. *A. excelsa*, R.Br.; *A. Cooperi*, Hook., et Bak.,) N.O. Filices, B.Fl., vii., 710, for *A. australis*, and 711 for *A. excelsa* and *A. Cooperi*. Bentham, however, expresses some doubts as to whether these may not be distinct species after all, and Baron Mueller (Cens., p. 137) records *A. australis* and *A. excelsa* as distinct species. Dr. Woolls further discusses the subject. *Proc. Linn. Soc. N.S.W.*, vi., 746.

"Tree Fern." The aboriginals of Illawarra (New South Wales) used to call it "Beeow-wang," and the aboriginals of Queensland, "Nanga-nanga." The aboriginals of the Corranderrk Station (Victoria) call it "Pooeet."

The pulp of the top of the trunk is full of starch, and is eaten raw and roasted by the aboriginals. This whitish substance is found in the middle of the tree from the base to the apex, and when boiled tastes like a bad turnip. Pigs feed on it greedily. (See also *Tasmanian Journal* for 1842, p. 35.)

Tasmania, Victoria, New South Wales, and Queensland, for *A. australis*; the two latter colonies for *A. excelsa*.

12. **Amarantus viridis,** *Linn.*, (Syn. *Euxolus viridis*, Moq.,) N.O. Amarantaceæ, B.Fl., v., 215. Bentham considers this may be introduced, and Mueller (Cens.) omits it.

This weed is a perfect nuisance in gardens and roadsides, but Mr. F. M. Bailey points out that besides being a fair substitute for cabbage, the leaves have been used externally with advantage as an emollient poultice. I have had this plant cooked, and I do not hesitate to pronounce it a valuable vegetable. It is an excellent substitute for spinach, being far superior to much of the leaves of the white beet sold for spinach in Sydney. Next to spinach it seems to be most like boiled nettle leaves, which when young are used in England, and are excellent. This *amarantus* should be cooked like spinach, and as it becomes more widely known, it is sure to be popular, except amongst persons who may consider it beneath their dignity to have anything to do with so common a weed.

All the colonies.

13. **Angiopteris evecta,** *Hoffm.*. N.O. Filices, B.Fl., vii., 694.

"The aboriginals used to feed on the pith of this tree-fern, which contains a certain amount of starch similar to sago." (Foster.)

This plant is not endemic in Australia.

Queensland.

14. **Apium australe,** *Thon.* (Syn. *A. prostratum*, Labill.; *Petroselinium prostratum*, DC.; *Helosciadium australe*, Bunge; *H. prostratum*, Bunge.), N.O. Umbelliferæ, B.Fl., iii., 372. *A. prostratum* in Muell. Cens., p. 63.

"Australian Celery."

"This plant may be utilised as a culinary vegetable." (Mueller.)

It is not endemic in Australia.

All the colonies.

15. **Aponogeton elongatus,** *F.v.M.*, and **A. monostachyus** *Linn.*, N.O. Alismaceæ, B. Fl., vii., 188.

"The tuberous roots of these water-plants are starchy, and of excellent taste, though not large" (Mueller.)

New South Wales, Queensland, and Northern Australia, *A. elongatus;* Queensland and Northern Australia, *A. monostachyus.*

16. **Araucaria Bidwillii,** *Hooker*, N.O. Coniferæ, B.Fl., vi., 243.

"Bunya Bunya."

"The cones shed their seeds, which are two to two and a-half inches long by three-quarters of an inch broad; they are sweet before being perfectly ripe, and after that resemble roasted chestnuts in taste. They are plentiful once in three years, and when the ripening season arrives, which is generally in the month of January, the aboriginals assemble in large numbers from a great distance around, and feast upon them. Each tribe has its own particular set of trees, and of these each family has a certain number allotted, which are handed down from generation to generation with great exactness. The bunya is remarkable as being the only hereditary property which any of the aborigines are known to possess, and it is therefore protected by law. The food seems to have a fattening effect on the aborigines, and they eat large quantities of it after roasting it at the fire. Contrary to their

usual habits, they sometimes store up the bunya nuts, hiding them in a water-hole for a month or two. Here they germinate, and become offensive to a white man's palate, but they are considered by the blacks to have acquired an improved flavour." (Hill.) Dr. Bennett mentions that after an indulgence in this exclusively vegetable diet they have an irresistible longing for flesh, and that in order to satisfy that craving cannibalism used to be frequent amongst those tribes who were visitors (for the purpose of eating the bunya-bunya seeds) of those tribes in whose territory the bunya-bunya tree grows.

Queensland.

17. **Astelia alpina,** *R.Br.*, N.O., Liliaceæ, B.Fl., vii., 11.

"The fruit is sweet, and the bases of the leaves are eaten." (R. C. Gunn.)

Tasmania, Victoria, and New South Wales.

18. **Astroloma humifusum,** *R.Br.*, (Syn. *A. pallidum*, Sond.; *Styphelia humifusa*, Pers.; *Ventenatia humifusa*, Cav.,) and **A. pinifolium,** (Syn. *Styphelia pinifolia*, Spreng., *Stenanthera pinifolia*, R. Br.,) N.O. Epacrideæ, B.Fl., iv., 156 and 159. *Styphelia humifusa* and *S. pinifolia* in Muell. Cens., p. 105.

Commonly called "Ground-berry." In Tasmania the fruits are often called "Native Cranberries."

The fruits of these dwarf shrubs are much appreciated by school-boys and aboriginals. They have a viscid sweetish pulp, with a relatively large stone. The pulp is described by some as being "apple-flavoured," though I have always failed to make out any distinct flavour.

All the colonies, except Queensland, *A. humifusa*; Tasmania, Victoria, and New South Wales, *A. pinifolia*.

19. **Atalantia glauca,** *Hook. f.*, (Syn. *Triphasia glauca*, Lindl.), N.O. Rutaceæ, B.Fl., i., 370.

"Native Kumquat," "Desert Lemon."

The fruit is globular, and about half-an-inch in diameter. It produces an agreeable beverage from its acid juice. A fair preserve may be made out of the fruit.

New South Wales and Queensland.

20. **Atherosperma moschata,** *Labill.,* N.O. Monimiaceæ, B.Fl., v., 284.

"Sassafras."

The fragrant bark of this tree has been used as tea in Tasmania. A decoction or infusion of the green or dried bark was made, and according to Mr. Gunn, it has a pleasant taste when taken with plenty of milk. Its effect is, however, slightly aperient.

It is also used in the form of a beer.

Tasmania, Victoria and New South Wales.

21. **Atriplex cinerea,** *Poir.* (Syn. *A. halimus,* R.Br., *A. elæagnoides,* Moq.,) N.O. Chenopodiaceæ, B.Fl., v., 171.

Once used as pot-herb in New South Wales. During his overland journey to Port Essington, Leichhardt used a species of *Atriplex* as a vegetable, and spoke very highly of it.

All the colonies.

22. **Avicennia officinalis,** *Linn.,* (Syn. *A. tomentosa,* Jacq.,) N.O. Verbenaceæ, B.Fl., v., 69.

"Mangrove." "Egaie," of the Cleveland Bay aboriginals; "Tagon-tagon," of the Rockhampton aboriginals; "Baa-lunn," and "Tchoonche" are other aboriginal names.

"The fruit is heart-shaped, with two thick cotyledons. The aboriginals of Cleveland Bay dig a hole in the ground, where they light a good fire; when well ignited, they throw stones over it, which when sufficiently heated, they arrange horizontally at the bottom, and lay on the top the *Egaie* fruit, sprinkling a little water over it; they cover it with bark, and over the whole earth is placed to prevent the steam from evaporating too freely. During the time required for baking (about two hours), they dig another hole in the sand; the softened *Egaie* is put into it, they pour water twice over it, and the *Midamo* is now fit for eating. They resort to that sort of food during the wet season when precluded from searching for any other." (Murrell's testimony,* quoted by Mons. Thozet.)

In Salt-water estuaries all round the coast.

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* Murrell was a shipwrecked sailor, who lived for seventeen years with the aboriginals of Cleveland Bay, Queensland.

23. **Banksia, spp.,** N.O. Proteaceæ, B.Fl., v., 541.

"Honeysuckle."

The name "honeysuckle" was applied to this genus by the early settlers, from the fact that the flowers, when in full bloom, contain, in a greater or lesser quantity, a sweet, honey-like liquid, which is secreted in considerable quantities, especially after a dewy night, and is eagerly sucked out by the aborigines. "It is so abundant in *B. ericifolia* and *B. collina* that when in flower the ground underneath large cultivated plants is in a complete state of puddle; bees and wasps become intoxicated, and many lose their lives in it." (Smith: *Dictionary of Useful Plants.*) This may possibly be true of a particular Banksia cultivated under exceptional conditions. But certainly it does not apply, except in a very modified degree, to the case of any Banksia I have noticed, and since I observed the above statement I have taken the trouble to look at hundreds of individuals of various species with the view to testing its accuracy. I have also requested Mr. Bäuerlen (a collector for the Technological Museum) to make similar observations, and he writes:—"I have never heard from anyone having observed the liquid exuding so abundantly as mentioned by Smith. I have often found the flowers pretty rich in the honey-like liquid, and when travelling over dry, waterless areas I have sometimes sucked the liquid from the flowers to quench my thirst, but always endeavour not to do so, as it invariably gives me a headache, and a feeling of nausea afterwards." See also *Grevillea, Hakea, Telopea, Lambertia* (all Proteaceous plants).

Throughout Australia.

24. **Billardiera scandens,** *Smith* (Syn. *B. mutabilis*, Salisb.; *B. latifolia*, Putterl.; *B. grandiflora*, Putterl.; *B. angustifolia*, DC.; *B. canariensis*, Wendl.,) N.O. Pittosporeæ, B.Fl., i., 123.

"Apple Berry."

The berries are acid and pleasant when fully ripe. From their shape children call them "dumplings." When unripe, a small quantity of the juice produces very disagreeable and persistent heartburn.

All the colonies except Western Australia.

25. **Bombax malabaricum,** *DC.* (Syn. *B. heptaphyllum*, Cav.; *Salmalia Malabarica*, Schott.), N.O. Malvaceæ, B.Fl., i., 223.

The "Simool" tree or "Malabar Silk-cotton" tree of India.

"The calyx of the flower-bud is eaten as a vegetable in India." (Brandis.)

Queensland and Northern Australia.

26. **Bowenia spectabilis,** *Hook.*, N.O. Cycadeæ, B.Fl., vi., 254.

"The yam-like rhizome is used largely for food by the natives." (Bailey.)

Queensland.

27. **Brasenia peltata,** *Pursh.*, (Syn. *Hydropeltis purpurea*, Mich.,) N.O. Nymphæaceæ, B.Fl., i., 60. *Cabomba peltata*, F.v.M., Muell. Cens., p. 1.

This plant is considered nutritious in America, probably from the large grained starch it contains.

Victoria, New South Wales, and Queensland.

28. **Buchanania arborescens,** *Blume* (Syn. *Coniogeton arborescens*, R.Br.,) N.O. Anacardiaceæ, Muell. Cens., p. 25.

The "Little Gooseberry-tree" of Leichhardt.

"The unripe fruits of this plant were gathered, and, when boiled, imparted an agreeable acidity to the water, and when thus prepared, tasted tolerably well. When ripe, they become sweet and pulpy, like gooseberries, although their rind is not very thick. This resemblance induced us to call the tree 'the little gooseberry' tree. It was much esteemed by the natives." (Leichhardt: *Overland Journey to Port Essington*, p. 479.)

Queensland.

29. **Caladenia, spp.,** N.O. Orchideæ, B.Fl., vi., 376.

"Spider Orchids."

These and other orchids have edible tubers.

Throughout Australia.

30. **Calophyllum inophyllum,** *Linn.*, N.O. Guttiferæ, B.Fl., i., 183.

The "Ndilo" of India.

During a debate on the Pearl Fisheries Bill in the Queensland Assembly, a clause was specially inserted to protect trees of this species at Thursday Island. A fine of £10 is inflicted on any person who cuts down or injures this or a cocoa-nut tree, or any other tree bearing edible fruit. This clause is, of course, in the interest of the aboriginals.

Queensland.

31. **Canavalia obtusifolia,** *DC.*, N.O. Leguminosæ, B.Fl., ii., 256.

"The seeds are eaten by the blacks after cooking, as they are poisonous in the raw state. Some shipwrecked sailors in North-west Australia were poisoned by them." (Forrest.)

New South Wales, Queensland, Northern and Western Australia.

32. **Capparis canescens,** *Banks*, N.O. Capparideæ, B.Fl., i., 96.

"Native Date." "Mondoleu" (diminutive of "Mondo," *C. Mitchelli*) of the aboriginals about Rockhampton.

"The fruit is pyriform and half an inch in diameter. It is eaten by the aborigines without any preparation." (Thozet.) Mr. P. O'Shanesy observes that the pulpy part in which these Australian species of Capparis are imbedded is a good substitute for mustard.

Queensland.

33. **Capparis Mitchelli,** *Lindl.*, (Syn. *Busbeckia Mitchelli*, F.v.M.,) N.O. Capparideæ, B.Fl., i., 95.

"Small Native Pomegranate," "Native Orange," "Mondo," of the aboriginals about Rockhampton (Queensland); "Karn-doo-thal," of the aboriginals of the Cloncurry River (Northern Queensland.)

The fruit is from one to two inches in diameter, and the pulp, which has an agreeable perfume, is eaten by the natives.

All the colonies, except Tasmania and Western Australia.

34. **Capparis nobilis,** *F.v.M.*, (Syn. *Busbeckia arborea*, F.v.M.; *B. nobilis*, Endl.), N.O. Capparideæ, B.Fl., i., 95.

"Native Pomegranate," "Grey Plum," "Caper-tree," "Karum," of the aboriginals about Rockhampton (Queensland).

The fruit, which is from one to two inches in diameter, is eaten by the natives.

New South Wales and Queensland.

35. **Cardamine hirsuta,** *Linn.*, (Syn. *C. parviflora*, Hook.; *C. debilis*, Banks; *C. paucijuga*, Turcz.,) N.O. C B.Fl., i., 70.

Called "Lady's Smock" in England. It is a "Cress."

This and other species afford excellent pot-herbs when luxuriant and flaccid. The present one is a common weed almost throughout the world.

Throughout the colonies.

36. **Cardiospermum Halicacabum,** *Linn.*, N.O. Sapindaceæ, B.Fl., i., 453.

"Heartseed," "Heart-pea," "Winter-cherry," "Balloon Vine."

This common tropical weed is eaten as a vegetable in the Moluccas.

Queensland and Northern Australia.

37. **Careya arborea,** *Roxb.*, (Syn. *C. australis*, F.v.M.; *Barringtonia Careya*, F.v.M.,) N.O. Myrtaceæ, B.Fl., iii., 289 (*C. australis* in Muell. Cens., p. 60).

Called "Broad-leaved Apple" tree. The "Barror" of the Rockhampton aboriginals. Variously called "Go-onje" and "Gunthamarra," by the aboriginals of the Cloncurry River (Northern Queensland); and "Otcho," by the aboriginals of the Mitchell River.

The Rev. J. E. Tenison-Woods records that the Queensland blacks eat the seeds, and he has heard it said that they roast and eat the fruit as well.

Queensland and Northern Australia.

38. **Cargillia australis,** *R.Br.*, (Syn. *Maba Cargillia*, F.v.M.; *Diospyros Cargillia*, F.v.M.,) N.O. Ebenaceæ, B.Fl., iv. 288. *Diospyros Cargillia* in Muell. Cens., p. 92.

"Black Plum," of Illawarra (New South Wales); "Booreerra," of some aboriginals.

The fruits are of the size of a large plum, and of a dark purple colour. They are eaten by the aboriginals.

New South Wales and Queensland.

39. **Carissa ovata,** *R.Br.*, (Syn. *C. Brownii*, F.v.M.,) N.O. Apocyneæ, B.Fl., iv., 305. *C. Brownii*, F.v.M., in Muell. Cens., p. 93.

"Native Scrub Lime." "Karey" of the aborigines of the Rockhampton tribe (Queensland); "Ulorin" of the aboriginals of Cleveland Bay tribe; "Kunkerbury" of the aboriginals of the Cloncurry River (Northern Queensland).

This little bush produces a very pleasant fruit, which is both agreeable and wholesome. It is like a sloe, egg-shaped, and about half-an-inch long. It exudes a viscid milky juice and contains a few woody seeds. "I can testify that the fruit is both agreeable and wholesome, and I never knew an instance of any evil consequences, even when they were partaken of most abundantly."—(Tenison-Woods, Vol. vii., 571., *Proc. Linn. Soc. N.S.W.*)

South Australia, New South Wales, and Queensland.

40. **Cassytha filiformis,** *Linn.*, (Syn. *C. guineensis*, Schum.,) N.O. Laurinæ, B.Fl., v., 311.

This and other species of *Cassytha* are called "Dodder-laurel." The emphatic name of "Devil's guts" is largely used. It frequently connects bushes and trees by cords, and becomes a nuisance to the traveller.

"This plant is used by the Brahmins of Southern India for seasoning their buttermilk." (*Treasury of Botany.*)

Queensland and Northern Australia.

41. **Castanospermum australe,** *A. Cunn.*, N.O. Leguminosæ, B.Fl., ii., 75.

"Moreton Bay Chestnut," "Bean" tree. Called "Irtalie" by the aboriginals of the Richmond and Clarence Rivers (New South Wales); and "Bogum" by others of Northern New South Wales.

"The beans are used as food by the aborigines, who prepare them by first steeping them in water from eight to ten days; they are then taken out, dried in the sun, roasted upon hot stones, pounded into a coarse meal, in which state they may be kept for an indefinite period. When required for use, the meal is simply mixed with water, made into a thin cake, and baked in the usual manner. In taste, cakes prepared in this way resemble a coarse ship biscuit." (C. Moore.)

A sample of starch from these beans was exhibited by Mr. Moore at the Intercolonial Exhibition of Melbourne, 1866.

Northern New South Wales and Queensland.

42. **Casuarina stricta,** *Ait.*, (Syn. *A. quadrivalvis*, Labill.; *C. macrocarpa*, A. Cunn.; *C. cristata*, Miq.; *C. Gunnii*, Hook.), N.O. Casuarineæ, B.Fl., vi., 195. *C. quadrivalvis* in Muell. Cens., p. 22.

"Shingle Oak," "Coast She-oak," "River Oak," "Salt-water Swamp Oak." The "Worgnal" of the aboriginals of the Richmond and Clarenc (New South Wales).

In cases of severe thirst, great relief may be obtained from chewing the foliage of this and other species, which, being of an acid nature, produces a flow of saliva—a fact well-known to bushmen who have traversed waterless portions of the country. This acid is closely allied to citric acid, and may prove identical with it. Children chew the young cones, which they call "oak apples."

All the colonies except Western Australia and Queensland.

43. **Chenopodium auricomum,** *Lindl.*, N.O. Chenopodiaceæ, B.Fl., v., 159.

This is another of the salt-bushes, which, besides being invaluable food for stock, can be eaten by man. All plants of the Natural Order Chenopodiaceæ (Salsolaceæ) are more or less useful in this respect.

The following account of its practical utilization will be of interest:—

"We have recently gathered an abundant harvest of leaves from two or three plants growing in our garden. These leaves were put into boiling water to bleach them, and they were then

cooked as an ordinary dish of spinach, with this difference in favour of the new plant, that there was no occasion to take away the threads which are so disagreeable in chicory, sorrel, and ordinary spinach. We partook of this dish with relish—the flavour—analogous to spinach, had something in it more refined, less grassy in taste. The cultivation is easy: sow the seed in April (October) in a well-manured bed, for the plant is greedy; water it. The leaves may be gathered from the time the plant attains 50 centimetres (say 20 inches) in height. They grow up again quickly. In less than eight days afterwards another gathering may take place, and so on to the end of the year."—*Journal de la Ferme et des Maisons de Compagne,* quoted in *Pharm. Journ.* [2] viii., 734.

In all the colonies except Tasmania and Western Australia.

44. **Chenopodium murale,** *Linn.*, (Syn. *C. erosum*, R.Br.,) N.O. Chenopodiaceæ, B.Fl., v., 160. Bentham considers this may have been introduced, and Muell. (Cens.) omits it altogether.

"Australian Spinach," "Fat-hen." Other species share this name.

A pot-herb, which may be utilised in the same manner as the preceding species.

Southern colonies.

45. **Citriobatus pauciflorus,** *A. Cunn.*, (Syn. *Ixiosporus spinescens*, F.v.M.,) N.O. Pittosporeæ, B.Fl., i., 122.

"Native Orange," "Orange Thorn."

The fruit is an orange berry with a leathery skin, about one inch and a half in diameter. The seeds are large. It is eaten by the aboriginals.

New South Wales, Queensland, and Northern Australia.

46. **Citris australis,** *Planch.*, (Syn. *Limonia australis*, A. Cunn.,) N.O. Rutaceæ, B.Fl., i., 371. *Citrus Planchonii*, F.v.M., in Muell. Cens., p. 112.

"Native Lime," "Orange."

The fruit, which is an inch and a-half in diameter and almost globular, yields an agreeable beverage from its acid juice.

New South Wales and Queensland.

47. **Claytonia balonensis (Balonnensis),** *Lindl.*, (Syn. *Calandrinia Balonnensis*, F.v.M.), N.O., Portulaceæ, B.Fl., i., 172.

Called "Periculia" by the aboriginals. (Stuart).

"This plant is eaten with bread by white people. The blacks also use it for food, mixed with baked bark." (Annie F. Richards, in *Proc. R.S.S.A.*, iv., 136.)

"The seed is used for making a kind of bread, after the manner of that of *Portulaca oleracea*." (Mueller, Fragm., x., 71.)

South Australia, New South Wales, and Queensland.

48. **Claytonia polyandra,** *F.v.M.*, (Syn. *Talinum polyandrum*, Hook.), N.O., Portulaceæ, B.Fl., i., 172.

"Coonda" of the aboriginals about Shark's Bay.

"Used as food by some Western Australian tribes." (Mueller and Forrest, *Plants Indigenous about Shark's Bay, W.A.*, 1883.)

North and Western Australia, South Australia, and New South Wales.

49. **Cocos nucifera,** *Linn.*, N.O., Palmæ, B.Fl., vii., 143.

"Cocoanut Palm."

This nut is so well known that the following few notes concerning it will be sufficient. As an article of food the kernel is of great importance to the inhabitants of the tropics. In the Laccadives it forms the chief food, each person consuming four nuts per day, and the fluid, commonly called milk, which it contains, affords them an agreeable beverage. While young they yield a delicious substance resembling blanc-mange.

Among other products of this palm may be mentioned "toddy," which when fermented is intoxicating; strong arrack is also distilled from it, besides which it yields vinegar and "jaggery," or sugar.

50. **Colocasia antiquorum,** *Schott*, (Syn. *Caladium acre*, R.Br., *Arum Colocasia*, Linn.), N.O., Aroideæ, B.Fl. vii., 155.

The "Taro" of the Fijians.

"This plant is cultivated in most tropical countries, Egypt, India, etc., for the sake of its leaves, which when uncooked are acrid, but on boiling, the water being changed, they lose their

acridity, and may be eaten as spinach." (*Treasury of Botany.*) "Acid fruits are added to assist the removal of the acridity. Hindoos and Mahometans are very fond of all parts of the plants of this genus." (Dymock.)

"When the crop is gathered in Fiji," says Dr. Seemann (*Flora Vitiensis*), "the tops of the tubers are cut off and at once replanted. The young leaves may be eaten like spinach, but, like the root, they require to be well cooked in order to destroy the acridity peculiar to aroideous plants. The Fijians prefer eating the cooked Taro when cold; Europeans as a rule like it quite hot, and, if possible, roasted. A considerable number of varieties are known, some better adapted for puddings, some for bread, or simply for boiling or baking. The outer marks of distinction chiefly rest upon the different tinge observable in the corm, leaf, stalks, and ribs of the leaves—white, yellowish, purple."

The roots are also largely consumed for food in Japan, and in a descriptive Catalogue of the Japanese exhibits at the Health Exhibition, London, 1884, they are styled "Japanese Potatoes."

Following is an analysis taken from the Catalogue:—

Albumen	1·427
Fat	0·080
Glucose	0·120
Starch	10·400
Pectose, etc.	1·154
Ash	0·987
Water	85·202
	100·

Queensland.

51. **Colocasia macrorrhiza,** *Schott,* (Syn. *Caladium macrorrhizon,* R.Br.; *Alocasia macrorrhiza,* Schott), N.O., Aroideæ, B.Fl., vii., 155.

"Pitchu," of the aboriginals of the Burnett River (Queensland); "Cunjevoi," of those of South Queensland; "Hakkin," of the Rockhampton (Queensland) aboriginals; "Bargadga," or "Nargan," of the Cleveland Bay aboriginals.

"The young bulbs, of a light rose colour inside, found growing on large old rhizomes, are scraped, divided into two parts, and put under hot ashes for about half an hour. When sufficiently baked, they are then pounded by hard strokes between two stones —a large one, *Wallarie*, and a small one, *Kondola*. All the pieces which do not look farinaceous, but watery when broken, are thrown away; the others, by strokes of the *Kondola*, are united by twos or threes, and put into the fire again; they are then taken out and pounded together in the form of a cake, which is again returned to the fire and carefully turned occasionally. This operation is repeated eight or ten times, and when the *Hakkin*, which is now of a green-greyish colour, begins to harden, it is fit for use." (Thozet.)

New South Wales and Queensland.

52. **Coprosma hirtella,** *Labill.*, (Syn. *C. cuspidifolia*, DC.), N.O., Rubiaceæ, B.Fl., iii., 429.

Fruit sweet, eatable, not agreeable. The fruits of other species may be eaten also.

All the colonies except Queensland and Western Australia.

53. **Coprosma Billardieri,** *Hook. f.*, (Syn. *C. microphylla*, Hook. f.; *Canthium quadrifidum*, Labill.; *Marquisia Billardieri*, A. Rich.), N.O., Rubiaceæ, B.Fl., iii., 430.

"Native Currant." "Morr," of the aboriginals of Coranderrk Station (Victoria).

This plant bears a small round drupe, about the size of a small pea. Mr. Backhouse states that (over half a century ago) when British fruits were scarce, it was made into puddings by some of the settlers of Tasmania, but the size and number of the seeds were objectionable.

Tasmania and Victoria.

54. **Cordia Myxa,** *Linn.*, (Syn. *C. dichotoma*, Forst.; *C. Brownii*, DC.; *C. latifolia*, Roxb.; *C. ixiocarpa*, F.v.M.; *C. obliqua*, Willd.; *C. polygama*, Roxb.), N.O., Boragineæ, B.Fl., iv., 386.

The "Sebesten Plum" of India.

"In India the tender young fruit is eaten as a vegetable, and is pickled; the ripe fruit is eaten, and is greedily devoured by birds; the kernel is eaten, and tastes somewhat like a filbert; that of the cultivated tree is better." (Brandis.)

Queensland.

55. **Correa alba,** *Andr.*, (Syn. *C. cotinifolia*, Salisb.; *C. rufa* Vent.; *Mazeutoxeron rufum*, Labill.), N.O., Rutaceæ, B.Fl. i., 354.

"Called "Cape Barren Tea" in Tasmania, on account of its use near that headland.

The leaves of this plant have been used by the sealers on the islands in Bass's Straits as a substitute for tea.

Tasmania, South Australia, Victoria, and New South Wales.

56. **Crinum flaccidum,** *Herb.*, (Syn. *Amaryllis australasica*, Ker; *C. australis*, Spreng.), N.O., Amaryllideæ, B.Fl., vi., 454.

The "Darling Lily."

This exceedingly handsome white-flowered plant, which grows back from the Darling, has bulbs which yield a fair arrowroot. On one occasion, near the town of Wilcannia, a man earned a handsome sum by making this substance when flour was all but unobtainable.

South Australia, Victoria, New South Wales, and Queensland.

57. **Cucumis trigonus,** *Roxb.*, (Syn. *C. pubescens*, Hook.; *C. jucundus*, F.v.M.; *C. picrocarpus*, F.v.M.), N.O., Cucurbitaceæ, B.Fl., iii., 317.

"Boomarrah," of the aborigines of the Cloncurry River (North Queensland).

Sir Thomas Mitchell, in one of his western trips, speaks of this plant growing in such abundance that the whole country seemed strewed with the fruit, which was then ripe, and of which the natives ate great quantities, and were very fond. It is about the size of a plum only.

In the *Treasury of Botany* it is observed that the tender tops of all the edible species of *Cucurbitaceæ*, boiled as greens or spinach, are even a more delicate vegetable than the fruit.

New South Wales, Queensland, Northern and Western Australia.

58. **Cyathea medullaris,** *Swartz*, N.O., Filices, B.Fl., vii., 708.

"Black-stemmed Tree-fern."

"The aboriginals used to feed on the pith of this tree-fern, which contains a certain amount of starch similar to sago." (Foster.)

Tasmania, Victoria, and New South Wales.

59. **Cycas media,** *R.Br.*, N.O., Cycadeæ, B.Fl., vi., 249.

"Nut Palm." "Baveu," of Central Queensland aboriginals.

"Employed by the aborigines as food. An excellent farina is obtained from it. The nuts are deprived of their outer succulent cover (sarcocarp) and are then broken; and the kernels, having been roughly pounded, are dried three or four hours in the sun, then brought in a dilly-bag to a stream or pond, where they remain in the running water four or five days, and in stagnant water three or four days. By a touch of the fingers the proper degree of softness produced by maceration is ascertained. They are afterwards placed between the two stones mentioned under *Colocasia macrorrhizon*, reduced to a fine paste, and then baked under the ashes in the same way that our bush people bake their damper." (Thozet.)

Queensland and Northern Australia.

60. **Cymbidium canaliculatum,** *R.Br.*, N.O., Orchideæ, B.Fl., vi., 302.

"The only orchid of the interior of tropical Australia which affords mucilaginous food." (Mueller.) The stems, etc., are eaten.

South Australia, New South Wales, Queensland, and Northern Australia.

61. **Cyttaria Gunnii,** *Berk.*, N.O., Fungi, Muell., Fragm., xi., 101, Supp.

This edible fungus is found on the branches of *Fagus Cunninghamii*, or native Beech.

Tasmania.

62. **Dendrobium canaliculatum,** *R.Br.*, (Syn. *D. Tattonianum*, Batem.), N.O., Orchideæ, B.Fl, vi., 282.

"Yamberin," of the Queensland aboriginals.

"The bulbous stems, after being deprived of the old leaves, are edible." (Thozet.)

Queensland.

63. **Dendrobium speciosum,** *Smith*, N.O., Orchideæ, B.Fl., vi., 279.

"Rock Lily."

The large pseudo-bulbs have been eaten by the aboriginals; they, however, contain but little nutritive matter.

Victoria, New South Wales, and Queensland.

64. **Dicksonia antarctica,** *Labill.*, (Syn. *D. Billardieri*, F.v.M.; *Cybotium Billardieri*, R. C. Gunn in Tas. Journ. 1842.), N.O., Filices, B.Fl., vii., 712. *D. Billardieri* in Muell. Cens., p. 137.

The pulp of the top of the trunk is full of starch, and is eaten by the aboriginals both raw and roasted.

"The native blacks of the colony used to split open about a foot and a-half of the top of the trunk, and take out the heart, in substance resembling a Swedish turnip, and of the thickness of a man's arm. This they either roasted in the ashes, or ate as bread; but it is too bitter and astringent to suit an English palate." (Gunn.)

All the colonies, except Western Australia.

65. **Dioscorea hastifolia,** *Endl.*, N.O., Dioscorideæ, B.Fl., vi., 461.

A "Yam."

"One of the hardiest of the yams. The tubers are largely consumed by the local aborigines for food; it is the only plant on which they bestow any kind of cultivation, crude as it is." (Mueller.)

Western Australia.

66. **Dioscorea sativa,** *Linn.*, (Syn. *D. latifolia*, Benth.; *D. bulbifera*, Forst.; *Helmia bulbifera*, Kunth), N.O., Dioscorideæ, B.Fl., vi., 461.

"Yam." "Karro," of the aboriginals of the Mitchell River (North Queensland.)

This yam is eaten by the aboriginals of Australia, and in India it is cultivated almost everywhere as a vegetable. In *Watts' Dict.* the tubers are said to contain 23 per cent. of starch, and 68 per cent. of woody fibre, gum, etc. In the same work, however, the tubers of *D. bulbifera* (merged in this species) are only credited with 10 per cent. of starch.

Queensland and Northern Australia.

67. **Dioscorea transversa,** *R.Br.*, (Syn. *D. punctata*, R.Br.), N.O., Dioscorideæ, B.Fl., vi., 460.

"Long Yam." "Kowar," of the aborigines of Central Queensland.

"The small young tubers are eaten by the aborigines without any preparation." (Thozet.)

New South Wales, Queensland, and Northern Australia.

68. **Dodonæa spp.** div., N.O., Sapindaceæ.

"Native Hops," on account of the capsules bearing some resemblance to hops, both in appearance and taste.

In the early days of settlement the fruits of these trees were extensively used, yeast and beer of excellent quality being prepared from them. They are still so used to a small extent. *D. attenuata*, A. Cunn., for instance, was largely used in the Western District. In times of drought cattle and sheep eat them.

Throughout the colonies.

69. **Diploglottis Cunninghamii,** *Hook. f.*, (Syn. *Cupania Cunninghamii*, Hook. f.; *C. australis*, Hook. f.; *Stadmannia australis*, Don), N.O., Sapindaceæ, B.Fl., i., 454.

"Tamarind Tree." "Burrunedura," of the aboriginals of Illawarra; and "Auceloby," and Toonoum," of those of northern New South Wales.

This tree produces racemes of pleasant sub-acid fruit, used for preserves.

New South Wales and Southern Queensland.

70. **Drimys aromatica,** *F.v.M.*, (Syn. *Tasmannia aromatica*, R.Br.), N.O., Magnoliaceæ, B.Fl., i., 49.

"Pepper Tree."

The drupe is used as a condiment, being a fair substitute for pepper, or rather allspice The leaves and bark also have a hot, biting, cinnamon-like taste

Tasmania, Victoria, and New South Wales .

71 **Elæagnus latifolia,** *Linn.*, (Syn. *E. conferta*, Roxb.; *E. ferruginea*, A. Rich.), N O., Elæagneæ, Muell Cens., p. 64.

"The fruit is eaten in India. It is acid and somewhat astringent. It makes good tarts." (Beddome.)

Queensland.

72. **Elæocarpus Bancroftii,** *F.v.M., and Bail.*, N.O., Tiliaceæ. *Proc. R.S Queensland, 1885.*

The cotyledons or "kernels" have a good flavour, and are eaten by the settlers. Other species of *Elæocarpus* have fruits which are more or less useful in this respect.

Johnstone River, Queensland.

73. **Entada scandens,** *Benth.*, (Syn. *E. Pursætha*, DC.; *Mimosa scandens*, Linn.), N.O., Leguminosæ, B.Fl., ii., 298. *E. Pursætha*, in Muell. Cens., p. 43.

"Queensland Bean," "Barbaddah," of the Cleveland Bay aboriginals.

"These large beans are eaten by the aboriginals. They are put into the stone oven and heated in the same way and for the same time as those of *Avicennia tomentosa* (q.v.); they are then pounded fine and put into a dilly-bag, and left for ten or twelve hours in water, when they are fit for use." (*Murrell's testimony*). The natives of India also eat them after roasting and soaking in water.

Queensland.

74. **Erythrina indica,** *Lam.*, N.O., Leguminosæ, B.Fl., ii., 253.

"Indian Coral" tree.

In Ceylon the young tender leaves are eaten in curries.

Queensland and Northern Queensland.

75. **Eucalyptus corymbosa,** *Smith*, (Syn. *Metrosideros gummifera*, Soland.), N.O., Myrtaceæ, B.Fl., iii., 256.

"Bloodwood."

Archdeacon King has noticed Mellitose-manna on the leaves of this tree to a small extent when they are pierced by a beetle. (*Anoplognathus cereus.*)

New South Wales and Queensland.

76. **Eucalyptus dumosa,** *A. Cunn.*, (a Mallee), B.Fl., iii., 230; **E. gracilis,** F.v.M., (a Mallee), B.Fl., iii., 211; **E. incrassata,** Labill., (a Mallee), B.Fl., iii., 231; **E. microtheca,** F.v.M.; ("Bastard Box" or "Coolibah,") B.Fl., iii., 223; **E. oleosa,** F.v.M., (a Mallee), B.Fl., iii., 248, N.O., Myrtaceæ.

These Eucalypts, amongst others, yield water from their roots. See page 1. See also *Hakea leucoptera* and *Vitis* (*Cissus*).

Chiefly in the arid regions of the colonies.

77. **Eucalyptus dumosa,** *A. Cunn.*, N O., Myrtaceæ, B.Fl., iii., 230.

"Lerp," "Larp," "Laap," or "Larap" Eucalypt.

This shrub yields a kind of manna called Lerp or Larp by the aboriginals. It is the nidus of an insect, and consists of starch-like substance, which is eaten in summer by the aborigines of the mallee country of Victoria. It somewhat resembles in appearance small shells; it is sweet, and in colour white or yellowish-white. According to Dr. Thomas Dobson, of Hobart, the insect which causes the Lerp to form is *Psylla Eucalypti*. It is probably formed on the leaves of other mallee Eucalypts.

"This substance occurs on the leaves, and consists of white threads clotted together by a syrup proceeding from the insect (*Psylla Eucalypti*) which spins those threads. It contains, in round numbers, of water 14 parts, thread-like portion 33 parts, sugar 53 parts. The threads possess many of the characteristic properties of starch, from which, however, they are sharply distinguished by their form. When lerp is washed with water the sugar dissolves and the threads swell but slightly, but dissolve to a slight extent, so that the solution is coloured blue by iodine. The threads freed from sugar by washing consist of a substance called *Lerp-amylum.*

"Lerp-amylum is very slightly soluble in cold water, not perceptibly more so in water at 100°, but entirely soluble to a thin

transparent liquid when heated to 135° in sealed tubes with 30 parts of water; this solution on cooling deposits the original substance in flocks, without forming a jelly at any time. The separation is almost complete.

"If the material employed in this experiment were entirely free from sugar, the liquid left after the separation of the flocks will also be free from sugar. The flocks deposited from solution are insoluble in boiling water, therefore lerp-amylum suffers no chemical change on being heated to 150° with water. Heated in the air-bath to 190° while dry, it turns brown, and is afterwards merely reddened by solution of iodine; at the same time it becomes partly soluble in hot water; hence it appears that lerp-amylum undergoes a change similar to that which occurs when starch is converted into dextrin. By oxidation with nitric acid it yields oxalic acid, but no mucic acid; it is neutral to vegetable colours, and is not precipitated by lead acetate, and is therefore not to be confounded with the gums, etc.

"It gave by analysis 43·7 and 43·07 carbon, 6·6 and 6·4 hydrogen, agreeing with the formula $C_6H_{10}O_5$ (44·4 C. and 6·24 H.) Like starch, lerp-amylum rotates the plane of polarisation to the right; and on digestion with dilute sulphuric acid, etc., forms a crystallisable carbo-hydrate which agrees in its properties with dextrin. It is insoluble in ammonia cuprate, and is homogeneous.

"Though the behaviour of lerp-amylum to iodine and to water, and its insolubility in cupra-ammonia distinguish it from cellulose, it is to be borne in mind that there are forms or conditions of cellulose which are blued by iodine and dissolve in water." (Flückiger, in *Watts' Dict.* vii., 2nd Suppl. 733.)

See also a paper: "On a new kind of Manna from New South Wales," by Th. Anderson (*Journ. für Prakt. Chemie.* xlvii., 449.)

Victoria, and Southern New South Wales.

78. **Eucalyptus dumosa,** *A. Cunn.*, (for synonyms see B.Fl.), N.O. Myrtaceæ, B.Fl., iii., 230.

The "White Mallee," of South Australia; "Weir-Mallee," of aboriginals; "Bunurduk," of the aboriginals of Lake Hindmarsh Station (Victoria).

"The blacks in South Australia powder the bark of the root of this and perhaps other Mallees, and eat it either alone, or mixed with portions of other plants. They call it 'Congoo.'" (*Proc. R S.S.A.*)

South Australia, Victoria, and New South Wales.

79. **Eucalyptus Gunnii,** *Hook. f.*, (Syn. *E. ligustrina*, Miq.; *E. acervula*, Hook. f.), N.O., Myrtaceæ, B.Fl., iii., 246.

In Tasmania this is known as "Cider Gum," and in South-Eastern Australia occasionally as the "Sugar Gum." In the same part it is known as "White Gum," "Swamp Gum," or "White Swamp Gum," and in the Noarlunga and Rapid Bay districts of South Australia as "Bastard White Gum." Occasionally it is known as "Yellow Gum." Near Bombala (New South Wales) two varieties go by the names of "Flooded or Bastard Gum," and "Red Gum."

The sweetish sap of this tree is often converted by settlers (especially in Tasmania) into a kind of cider.

Tasmania, Victoria, and New South Wales.

80. **Eucalyptus Raveretiana,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm. x.

"Grey Gum," "Iron Gum," "Thozet's Box."

"From cuts in the stem an acidulous, almost colourless liquid exudes in considerable quantity, in which respect this species resembles *E. Gunnii*." (Mueller.)

Queensland.

81. **Eucalyptus viminalis,** *Labill.*, (Syn. *E. fabrorum*, Schlecht, and several other synonyms), N.O., Myrtaceæ, B.Fl., iii., 239.

The "White Gum," or "Swamp Gum" of Tasmania. It is also called "Manna Gum." Other names are "Grey Gum," "Blue Gum," "Drooping Gum," etc.

From the bark of this tree a kind of manna exudes. It is a crumbly white substance, of a very pleasant, sweet taste, and in much request by the aborigines.

A white, nearly opaque manna from the normal *E. viminalis* was found by Mr. Bäuerlen at Monga, near Braidwood (New South Wales). It is in small pieces, about the size of peas, but of

irregular, flattened shape. In appearance it very much resembles lime which has naturally crumbled or slacked by exposure to a moist atmosphere.

It is composed of an unfermentable sugar called *Eucalin*, which is peculiar to the sap of the Eucalyptus, together with a fermentable sugar, supposed to be *Dextroglucose*. The manna is derived from the exudation of the sap, which "drying in the hot parched air of the midsummer, leaves the sugary solid remains in a gradually increasing lump, which ultimately falls off, covering the ground in little irregular masses." (McCoy.) This exudation of the sap is said by McCoy to take place from the boring of the "Great Black or Manna Cicada." (*C. mœrens.*)

The Hon. William Macleay of Sydney is, however, by no means of that opinion, as he thinks it cannot be doubted that the manna is the work of a gall-making *Coccus*. The subject requires clearing up, and it is to be hoped that a naturalist will give his earnest attention to the matter.

South Australia, Tasmania, Victoria, and New South Wales.

82. **Eucheuma speciosa,** *J. Agardh.*, (Syn. *Gigartina speciosa*, Sond.), N.O., Algæ, Plate LXIV. Harvey's *Phycologia Australasica*.

"Jelly Plant," of Western Australia.

This is a remarkable sea-weed of a very gelatinous character which enters into the culinary arrangements of the people of Western Australia for making jelly, blanc-mange, etc. Size and cement can also be made from it. It is cast ashore from deep water.

Coast of Western Australia.

83. **Eugenia Jambolana,** *Lam.*, (Syn. *E. Moorei*, F.v.M.; *Syzygium Jambolanum*, DC.), N.O., Myrtaceæ, B.Fl. iii., 283. *E. Moorei* in Muell. Cens., p. 59.

"Durobbi," of the aboriginals.

"The fruit is much eaten by the natives of India; in appearance it resembles a damson, has a harsh but sweetish flavour,

somewhat astringent and acid. It is much eaten by birds, and is a favourite food of the large bat or flying fox." (Brandis.)

New South Wales and Queensland.

84. **Eugenia myrtifolia,** *Sims.*, (Syn. *E. australis,* Wendl.; *Jambosa australis,* DC.; *J. Thozetiana,* F.v.M.), N.O., Myrtaceæ, B.Fl., iii., 286.

"Brush Cherry," or "Native Myrtle."

The fruit is acid, and makes a good preserve.

"The red juice of the fruit of this tree is similar in its properties to that of red grapes. It contains free tartaric acid, cream of tartar, sugar, and red colouring matter very sensitive to the action of acids and alkalies. By fermentation it yields wine possessing a bouquet. The colouring matter, which is soluble in alcohol and ether-alcohol, but not in pure ether, is precipitated by lead-acetate, decolourised by reducing agents, and recovers its red colour on exposure to the air, just like litmus and the red colour of wine." (De Luca and Ubaldini, in *Watts' Dict.*, vi., 1st Supp., 608.)

New South Wales and Queensland.

85. **Eugenia Smithii,** *Poir.*, (Syn. *Acmena floribunda,* var. *β.* DC.; *A. elliptica,* Don; *Myrtus Smithii,* Spreng.; *Syzygium brachynemum,* F.v.M.), N.O., Myrtaceæ, B. Fl., iii., 283.

"Lilly Pilly." Called "Tdgerail," by the aboriginals of Illawarra (New South Wales); and "Coochin-coochin," by some Queensland aboriginals.

The fruits are eaten by the aboriginals, small boys, and birds. They are formed in profusion, are acidulous, and wholesome, They are white with a purplish tint, and up to one inch in diameter.

Victoria to Northern Australia.

86. **Eugenia Tierneyana,** *F.v M.*, N.O., Myrtaceæ, B.Fl., iii., 284

The fruit of this tree is used for jam making by the settlers. It is produced in very large quantities.

Queensland.

87. **Eustrephus latifolius,** *R.Br.*, (Syn. *E. Brownii* F v.M.; *E. Watsonianus*, Miq.; *Luzuriaga latifolia*, Poir.), N.O., Liliaceæ, B.Fl., vii., 18. *E. Brownii* in Muell. Cens., p. 117.

"This climber produces sweet though only small tubers, which, however, are probably capable of enlargement through culture." (Mueller.)

Victoria, New South Wales, and Queensland

88. **Exocarpus cupressiformis,** *R.Br.*, (Syn. *Leptomeria acerba*, Sieb. non R.Br.), N.O., Santalaceæ, B.Fl., vi., 229. *Exocarpos* in Muell. Cens.

"Native Cherry." "Tchimmi-dillen," of Queensland aboriginals; "Coo-yie," is another aboriginal name.

The fruit is edible. The nut is seated on the enlarged succulent pedicel. This is the poor little fruit of which so much has been written in English descriptions of the peculiarities of the Australian flora. It has been likened to a cherry with the stone outside (hence the vernacular name) by some imaginative person.

All the colonies.

89. **Exocarpus latifolia,** *R.Br.*, (Syn. *E. miniata*, Zipp.; *E. luzoniensis*, Presl.; *E. ovata*, Schnitzl.), N.O., Santalaceæ, B.Fl., vi., 228.

Broad-leaved "Native Cherry," "Scrub Sandalwood." "Oringorin" of the Queensland aboriginals; and "Ballat" of those of Gippsland.

The fruit is edible, being much the same as the preceding species. This plant is not endemic in Australia.

Northern New South Wales to North Australia.

90. **Ficus aspera,** *Forst.*, (Syn. *F. scabra*, Forst.), N.O., Urticeæ, B.Fl, vi., 174. *F. scabra* in Muell. Cens., p. 22.

"Rough-leaved Fig." Called also "Purple Fig" and "White Fig." "Noomaie," of the Rockhampton aboriginals; "Balemo," of the Cleveland Bay (Queensland) aboriginals.

"The fruit, which is black when ripe, is eaten by the aboriginals." (Thozet.)

Victoria to Queensland.

91. **Ficus glomerata,** *Willd.*, (Syn. *F. vesca*, *F.v.M.*; *Covellia glomerata*, Miq.), N.O., Urticeæ, B.Fl., vi., 178.

"Clustered Fig" tree.

The fruit, which is of a light red colour when ripe, hangs in clusters along the trunk and on some of the highest branches and is used as food by the aborigines.

"The ripe fruit is eaten, and is good either raw or stewed." (Gamble, *Manual of Indian Timbers.*) Brandis, however, says: "In times of scarcity the unripe fruit is pounded, mixed with flour, and made into cakes."

Queensland and Northern Australia.

92. **Ficus platypoda,** *A. Cunn.*, (Syn. *Urostigma platypodum*, Miq.), N.O., Urticeæ, B.Fl., vi., 169.

On his journey from Western Australia to the overland telegraph line, Mr. John Forrest, on more than one occasion, pronounced the fruit of this tree to be "very good."

P. A. O'Shanesy (*Proc. Linn. Soc. N.S.W.*, vi., 736), however, states that the fruit of this species is not edible. But the appetities of explorers frequently become voracious, and not too discriminating.

South Australia, Queensland, and Northern Australia.

93. **Fusanus acuminatus,** *R.Br.*, (Syn. *Santalum Preissianum*, Miq.; *S. acuminatum*, A.DC.), N.O., Santalaceæ, B. Fl. vi., 215. *S. acuminatum* in Muell. Cens., p 64.

"Quandong," "Native Peach."

The fleshy pericarp which envelops the seed known as the Quandong, makes an excellent sub-acid preserve and jelly. It is somewhat of the same flavour as the black guava. By simply extracting the stones and drying the fruit in the sun, it may be dried and used when convenient, just like preserved apples. The kernel is also edible, being very palatable. It is quite spherical.

All the colonies, except Tasmania and Queensland.

94. **Fusanus persicarius,** *F.v.M.*, (Syn. *Santalum persicarium*, F.v.M.), N.O., Santalaceæ, B.Fl., vi. 216.

"Native Sandalwood."

"The root-bark is used as food by the aboriginals." (Hokero.)

All the colonies, except Tasmania and Queensland.

95. **Gastrodia sesamoides,** *R.Br.*, N.O., Orchideæ, B.Fl., vi., 309.

"Native Potato," of parts of Tasmania.

The tubers were roasted and eaten by the Tasmanian natives. These tubers grow out of one another, and are of the size, and of nearly the form of kidney potatoes; the lowermost is attached by a bundle of thick fleshy fibres to the root of the tree from which it derives its nourishment. Mr. R. C. Gunn described the taste of them as somewhat resembling beetroot.

All the colonies except South and Western Australia.

96. **Gaultheria antipoda,** var: *Forst.*, (Syn. *G. depressa*, Hook., f.), N.O., Ericaceæ, B.Fl., iv., 142.

The fruit is of superior flavour.

Tasmania.

97. **Gaultheria hispida,** *R.Br.*, N.O., Ericaceæ, B.Fl., iv., 141.

"Wax-cluster."

The fruit is eatable. The flavour is difficult to describe, but it is not unpleasant. The late Mr. R. C. Gunn states that in tarts the taste is something like that of young gooseberries, with a slight degree of bitterness.

Tasmania, Victoria, and New South Wales.

98. **Geitonoplesium cymosum,** *A. Cunn.*, (Syn. *G. montanum*, A. Cunn.; *G. asperum*, A. Cunn.; *G. angustifolium*, A. Koch; *Luzuriaga cymosa*, R.Br.; *L. montana*, R.Br.), N.O., Liliaceæ, B.Fl., vii., 19.

"The young shoots offer a fair substitute for asparagus." (O'Shanesy.) And Baron Mueller suggests the culture of the plant with the view to its improvement.

Victoria, New South Wales, and Queensland.

99. **Geranium dissectum,** *Linn.*, (Syn. *G. parviflorum*, Willd.; *G. pilosum*, Forst.; *G. philonothum*, DC.; *G. potentilloides*, L'Hér.; *G. australe*, Nees), N.O., Geraniaceæ, B.Fl., i., 296.

"Crow-foot." Called "Native Carrot" in Tasmania.

The roots used to be eaten by the Tasmanian aboriginals, and doubtless by those of Australia. They used to roast them, for they are large and fleshy. This plant is not endemic in Australia.

Throughout the colonies.

100. **Gleichenia dichotoma,** *Hook.*, (Syn. *G. Hermanni*, R.Br.; *Polypodium dichotomum*, Thunb.; *Mertensia dichotoma*, Willd.), N.O., Filices, B.Fl., vii., 698. G. *Hermanni* in Muell. Cens., p. 137.

The aboriginals have used the root of this fern for the purpose of extracting the starch for food. This plant is not endemic in Australia.

New South Wales, Queensland and Northern Australia.

101. **Gracilliaria confervoides,** var: *Grev.*, N.O., Algæ, Harvey's *Phycologia Australasica.*

This almost cosmopolitan sea-weed is used for making a jelly in Tasmania. For ordinary purposes it can be ranked in nutritive value with Irish or Caragheen Moss.

Tasmania and South Coast of Australia.

102. **Grevillea annulifera,** *F.v.M.*, N.O., Proteaceæ, B.Fl. v., 460.

The seeds are comparatively large, of almond taste, and the fruits are produced copiously. The shrub will live in absolute desert sands. (Mueller.)

Western Australia.

103. **Grevillea Kennedyana,** *F.v.M.*, N.O., Proteaceæ, *Proc. R.S. Vict.*, 1887.

Many of the Grevilleas contain more or less honey, but this recently discovered one contains it the most abundantly, as far as I am aware. The flowers are exceedingly rich in a clear, sweet, honey-like liquid, which can be easily shaken out from the

111. **Hirneola auricula—Judæ,** *Fries*, (Syn. *Exidia auricula-Judæ*, Fries), N.O., Fungi, F.v.M. Fragm., xi. (Suppl.), 90.

This species is largely used in China as food. It is a common European species, growing chiefly on the elder, but also on the elm.

Victoria, Tasmania, and New South Wales.

112. **Hirneola polytricha,** *Fries*, N.O., Fungi, Fragm., xi. (Suppl.), 90.

"This is the common form in Port Jackson and along the east coast. It is also found in New Zealand, where it became an article of export for the Chinese market. It is used to thicken soup." (Tenison-Woods and Bailey, *Proc. Linn. Soc. N.S.W.*, v., 77.)

South Australia, New South Wales, and Queensland.

113. **Hovea longipes,** *Benth.*, (Syn. *H. leiocarpa*, Benth.), N.O., Leguminosæ, B.Fl., ii., 174.

Mr. P. A. O'Shanesy says that the young pods of this shrub are eaten by the Queensland aborigines.

New South Wales and Queensland.

114. **Ipomœa spp.,** N.O., Convolvulaceæ.

"Native Yams."

The tubers of these plants are sometimes eaten by the aboriginals.

115. **Lagenaria vulgaris,** *Ser.*, N.O., Cucurbitaceæ, B.Fl., iii., 316.

The fruit of this plant is purgative, and even poisonous, but after due preparation the aboriginals have been known to eat it, while some of the cultivated varieties seem to be eaten with impunity in various parts of the world.

At the Health Exhibition of 1884, held in London, the dried fruit from Japan was exhibited. The following particulars are taken from the catalogue of the Japanese exhibits. The method of manufacturing it is the following :—The first step is to cut off the extremities ; then the seeds and pulp are taken out. The fruit

is then cut to a certain length, and is dried by hanging it on sticks. It will thus be preserved for a long period, if kept in proper vessels and closed tightly. The method of cooking is by boiling with water, soy, sugar, mirin (sweet wine), etc. Following is an analysis :—

Albumen	8·322
Extract by Petroleum ether	1·544
Glucose	20·080
Dextrin	15·410
Non-nitrogenous substances and starch traces	18·688
Cellulose	10·686
Ash	4·920
Water	20·390
	100·040

Carbon	37·855	Dry substances 79·65 per cent.
Nitrogen	1·310	
Hydrogen	4·380	
Oxygen	31·182	
Ash	4·920	
Water	20·350	
	99·997	

Queensland.

116. **Lambertia formosa**, *Smith*, (Syn. *Protea nectarina*, Wendl.,) N.O., Proteaceæ, B.Fl., v., 415.

"Honey-flower," or "Honeysuckle."

This plant is as well known to small boys about Sydney as it is to birds and insects. It obtains its vernacular name on account of the large quantity of a clear honey-like liquid the flowers contain. After sucking some quantity the liquid generally produces nausea and headache. Sometimes it is so plentiful as to flow down the twigs. See *Banksia*.

New South Wales and Western Australia.

117. **Lavatera plebeia**, *Sims.*, (Syn. *L. Behriana*, Schlect.; *Malva Behriana*, Schlecht.; *M. Preissiana*, Miq.), N.O., Malvaceæ, B.Fl., i., 185.

"Tree Mallow."

"In the early days of South Australia the roots of a white-flowering variety of this mallow were largely used by the natives for food. These roots were somewhat of the consistency of parsnips." (Bailey.)

All the colonies except Queensland.

125. **Livistona australis,** *Mart.*, (Syn. *L. inermis*, Wendl. *Corypha australis*, R.Br.), N.O., Palmæ, B.Fl., vii., 147. Muell. in Cens., p. 120, separates *L. inermis* from *L. australis*.

"Cabbage Tree." "Kondo" of the aboriginals.

The aboriginals are very fond of the growing centre or heart of this tree, which they eat in a raw or cooked state. But Baron Mueller says that the value of this esculent was not known to them in their uncivilized state.

"Several of my companions suffered by eating too much of the Cabbage-palm" (Leichhardt, *Overland Expedition to Port Essington.*) At p. 41, he says, "the tops of the Corypha palm eat well, either baked in hot ashes or raw, and, though very indigestible, did not prove injurious to health when eaten in small quantities."

Victoria to Queensland.

126. **Maba laurina,** *R.Br.*, N.O., Ebenaceæ, B.Fl., iv., 289.

This tree bears green, palm-like fruit, which is edible. (Kennedy.)

Queensland.

127. **Macadamia ternifolia,** *F.v.M.*, (Syn. *Helicia ternifolia*, F.v.M.), N.O., Proteaceæ, L.Fl., v., 406.

"Queensland Nut." Kindal-kindal" of the aboriginals.

This tree bears an edible nut of excellent flavour, relished both by aborigines and Europeans. As it forms a nutritious article of food to the former, timber-getters are not permitted to fell these trees. It is well worth extensive cultivation, for the nuts are always eagerly bought.

Northern New South Wales and Queensland.

128. **Macrozamia spp.,** N.O., Cycadeæ, B.Fl., vi., 250. *Encephalartos* in Muell. Cens., p. 110.

"The kernels of the nut, after being pounded, macerated and baked, are eaten by the natives. Curiously enough, the original occupants of the soil seemed never to have made use of the copious starch, which can be readily washed out of the comminuted stems

of any Cycadaceous plants. All these plants are pervaded by a virulent poison-principle, which becomes inert or expelled by heat." (Mueller.)

In all the colonies except Tasmania and Victoria.

129. **Macrozamia Miquelii,** *F.v.M.*, (Syn. *Encephalartos Miquelii*, F.v.M.; *E. tridentatus*, Lehm.), N.O., Cycadeæ, B.Fl., vi., 253.

" Dwarf Zamia." " Banga " of Central Queensland aboriginals.

Found generally in the same locality as *Cycas media*, with a large cone fruit not unlike a pine-apple. The seeds, orange-red when ripe, and separating freely, are baked for about half-an-hour under ashes; the outside covers and stones are then broken, and the kernels, divided by a stroke of the *Kondola*, are put into a dilly-bag and carried to a stream or pond, where they remain six or eight days before they are fit for eating. (Thozet.)

Queensland.

130. **Macrozamia spiralis,** *Miq.*, (Syn. *Zamia spiralis*,. R.Br.; *Encephalartos spiralis*, Lehm.), N.O., Cycadaceæ, B.Fl., vi. 251. *Encephalartos spiralis* in Muell. Cens., p. 110.

" Burrawang Nut," so called because they used to be, and are to some extent now, very common about Burrawang, N.S.W.

The nuts are relished by the aboriginals. An arrowroot of very good quality is obtained from them.

New South Wales and Queensland.

131. **Marattia fraxinea,** *Smith*, (Syn. *M. salicina*, Smith), N.O., Filices, B.Fl., vii., 695.

The aboriginals used to feed on the pith of this tree-fern, which contains a certain amount of starch similar to sago. (Foster.) The roots were used for a similar purpose. This plant is not endemic in Australia.

New South Wales and Queensland.

132. **Marlea Vitiensis,** *Bentham*, (Syn. *Rhytidandra vitiensis*, A. Gray; *R. polyosmoides*, F.v.M.; *Pseudalangium polyosmoides*, F.v.M.), N.O., Cornaceæ, B.Fl., iii., 386. *Rhytidandra vitiensis* in Muell. Cens., p. 74.

" Musk Tree."

"Nardoo seeds are pounded by the above, placing a few in at a time with the left hand. The 'tap-tap' of the process may be heard in the camp far into the night at times."

All the colonies, except Tasmania.

135. **Melodorum Leichhardtii,** *Benth.*, (Syn. *Unona Leichhardtii*, F.v.M.), N.O., Anonaceæ, B.Fl., i. 52.

"Merangara" of the aboriginals.

"This tree has an oblong or almost round fruit, with one or two seeds. It is eaten by the aborigines without any preparation." (Thozet.)

Northern New South Wales and Queensland.

136. **Mesembryanthemum æquilaterale,** *Haw.*, (Syn. *M. glaucescens*, Haw.; *M. Rossi*, Haw.; *M. nigrescens*, Haw.; *M. præcox*, Haw.), N.O., Ficoideæ, B.Fl., iii., 324.

"Pig Faces." "Karkalla," of the Port Lincoln (S.A.) aboriginals; "Katwort," of the East Gippsland aborigines; "Berudur," of those of the Lachlan River (New South Wales). It was the "Canajong," of the Tasmanian aboriginal.

The fleshy fruit is eaten raw by the aborigines. The leaves are eaten baked. Wilhelmi, in *Proc. R.S. Vict.*, 1860, gives an interesting account of the preparation of this substance for food by the Port Lincoln natives (S.A.): "Pressing the fruit (pigs' faces) between their fingers, they drop the luscious juice into their mouth. During the 'Karkalla' season, which lasts from January to the end of summer, the natives lead a comparatively easy life; they are free from any anxiety of hunger, as the plant grows in all parts of the country, and most abundantly on the sandy hills near the sea. The men generally gather only as much as they want for the moment, but the women collect large quantities for eating after supper. The Port Lincoln blacks eat only the fruit of this plant, but those living between the Grampians and the Victorian ranges, as a substitute for salt with their meat, eat also the leaves of this saline plant."

All the colonies.

137. **Microseris Forsteri,** *Hook.*, (Syn. *Scorzonera scapigera*, Forst.; *S. (Monermios) Lawrencii*, Hook. f.; *Phyllopappus lanceolatus*, Walp.), N.O., Compositæ, B.Fl., iii., 676.

"Murr-nong," or "Mirr n' yong," of the aboriginals of New South Wales and Victoria.

The tubers were largely used as food by the aboriginals. They are sweet and milky, and in flavour resemble the cocoanut.

All the colonies.

138. **Mimusops Browniana,** Benth., (Syn. *M. Kauki*, R.Br.; *M. Kauki*, var. *Browniana*, A.DC.), N.O., Sapotaceæ, B.Fl., iv., 285.

The fruit is edible.

Queensland.

139. **Mimusops parvifolia,** *R.Br.*, N.O., Sapotaceæ B.Fl., iv., 284.

This tree yields a thick milky sap, which tastes like fresh cream. (Hill.)

Queensland and Northern Australia.

140. **Morinda citrifolia,** *Linn.*, (Syn. *Sarcocephalus cordatus*, Miq.; *S. undulatus*, Miq.; *S. Leichhardtii*, F.v.M.; *Nauclea Leichhardtii*, F.v.M.; *N. coadunata*, Smith; *N. undulata*, Roxb.; *N. cordata*, Roxb.,) N.O. Rubiaceæ, B.Fl., iii., 402 and 423; Muell. Cens., 74 and 75.

"Leichhardt's Tree," "Canary Wood," "Indian Mulberry." "Oolpanje," of the aboriginals of the Mitchell River; and "Coobiaby," of those on the Cloncurry River; both in Northern Australia. It is the "Toka" of those of Rockhampton; and "Taberol" of those of Cleveland Bay.

"It has a bitter-flavoured, granulated fruit, of which the natives are very fond." (Thozet.)

Queensland and Northern Australia.

141. **Mucuna gigantea,** *DC.*, N.O., Leguminosæ, B.Fl., ii., 254.

"The seeds are eaten by the blacks after due preparation." (Woolls.) This plant is not endemic in Australia.

Northern New South Wales, Queensland, and Northern Australia.

142. **Muhlenbeckia adpressa,** *Meissn.*, var. **hastifolia,** (Syn. *M. Gunnii*, Hook, f.; *Polygonum adpressum*, Hook, f.), N.O., Polygonaceæ, B Fl., v., 274.

"Native Ivy." "Macquarie Harbour Vine or Grape," of Tasmania.

The currant-like fruits are sub-acid, and were, and perhaps still are used for tarts, puddings, and preserves; the leaves taste like sorrel.

All the colonies except Queensland.

143. **Mylitta australis,** *Berk.*, (Syn. *Notihydnum australe*, F.v.M.), N.O., Fungi. Muell. Fragm., xi., 101.

"Truffles," or "Native Bread."

This insipid underground fungus is generally met with by accident. When growing rapidly it sometimes causes the ground to crack, and may thus be discovered by a careful observer, as it probably was by the aborigines, who used it as food. It should be boiled, though cooking changes its character but little. It is said to taste like boiled rice. It is, however, perfectly insipid.

"The largest I have seen is about the size of a child's head, but a much larger one was dug up at Melbourne some months ago." (Woolls, 1859.)

"It has a black skin which drops off in little fragments, enclosing a veined white mass, which at first is soft, and has a peculiar acid smell, but when dry becomes extremely hard and horny." (*Treasury of Botany*). Mr. Brough Smyth likens its appearance to unbaked brown bread. Backhouse states that the natives always informed him that they obtained it from the neighbourhood of a rotten tree.

An interesting note on a specimen from Tasmania, by Mr. Wm. Southall, F.L.S., will be found in *Pharm. Journ.* [3], xv., 210, and a drawing of a section of a young plant is also given.

Victoria, New South Wales and Tasmania.

144. **Myoporum debile,** *R.Br.*, (Syn. *M. diffusum*, R.Br.; *Pogonia debilis*, Andr.; *Andreusia debilis*, Vent.; *Capraria calycina*, A. Gray), N.O:, Myoporineæ, B.Fl., v., 8.

"Amulla," of the aborigines.

The fruit, which is a quarter of an inch in diameter, is slightly bitter to the taste. It is eaten by the aboriginals.

New South Wales and Queensland.

145. **Myoporum serratum,** *R.Br.*, (Syn. *M. insulare*, R.Br.; *M. tasmanicum*, A.DC.), N.O., Myoporineæ, B.Fl., v., 6, *M. insulare* in Muell. Cens., p. 104.

"Blue-berry" tree, "Native Currant" tree, "Native Myrtle," "Native Juniper," "Cockatoo Bush." "Palberry" of the aborigines of the Coorong (South Australia.)

The berries are edible, though somewhat of a saltish and bitter flavour. They are much relished by birds.

All the colonies except Queensland.

146. **Myoporum platycarpum,** *R.Br.*, (Syn. *Disoon platycarpus*, F.v.M.), N.O., Myoporinæ, B.Fl., v., 7.

"Sandalwood," "Dogwood."

The saccharine exudation or manna from this tree is of a dirty-white colour with a pinkish tinge, and is eagerly sought after and eaten by the aborigines. It is exceedingly sweet, and very pleasant to the taste.

All the colonies except Tasmania and Queensland.

147. **Myrtus acmenioides,** *F.v.M.*

"White Myrtle," of the Richmond and Clarence. "Lignumvitæ."

Myrtus fragrantissima, *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 276-7.

The leaves of these two species are used for flavouring tea in Queensland. (O'Shanesy.)

New South Wales and Queensland.

148. **Nasturtium palustre,** *DC.*, (Syn. *N. terrestre*, R.Br.; *N. semipinnatifidum*, Hook.), N.O., Cruciferæ, B.Fl., i., 65.

Called "Native Cabbage" on the banks of the River Nepean (New South Wales).

This and other species afford excellent pot-herbs when luxuriant and flaccid. (Hooker.) This plant is not endemic in Australia.

All the colonies except Western Australia.

149. **Nelumbium speciosum,** *Willd.*, (Syn. *N. nucifera*, Gærtn.), N.O., Nympheaceæ, B.Fl., i., 62. *Nelumbo nucifera*, in Muell. Cens., p. 1.

"Sacred Lotus," "Pink Water-lily." "Aquaie," of the aboriginals.

"This plant was worshipped by the ancient Egyptians. It no longer is found on the Nile, but in many parts of Asia, and in India, China, and Japan, it is still held sacred. In China, India, and North Australia the root, stock and seeds are used as food, while medicinal properties are assigned to the viscid juice of the leaf-stalks." (*Treasury of Botany.*) The seeds are eaten raw, or roasted as coffee. (*Hooker.*)

Queensland and Northern Australia.

150. **Nitraria Schoberi,** *Linn.*, (Syn. *N. Billardieri*, DC.; *N. Olivieri*, Jaub., and Spach.; *Zygophyllum australasicum*, Miq.), N.O., Zygophyllæ, B.Fl., i., 291.

"Karambi," of Port Lincoln natives, South Australia.

It produces fruit of the size of an olive, of a red colour, and agreeable flavour. When the weather is hot the natives lie at full length under a bush, and do not leave it until they have stripped it of its berries. (Wilhelmi.) *Proc. R.S. Vic.*, 1860, p. 143. This plant is not endemic in Australia.

All the colonies, except Tasmania and Queensland.

151. **Nymphæa gigantea,** *Hook.*, (Syn. *N. stellata* F.v.M.), N.O., Nymphæaceæ, B.Fl., i., 61. *N. gigantea* and *N. stellata* are separated into two species, Muell. Cens., p. 1.

"Blue Water-lily." "Yako Kalor" of the Rockhampton aborigines (Queensland); "Kaooroo," of those of Cleveland Bay; "Arnurna" of those of the Mitchell River.

The roots and fruit are eaten. The flower-stalks, too, may be eaten when young. (Thozet.).

New South Wales, Queensland, and Northern Australia.

152. **Ocimum sanctum,** *Linn.*, (Syn. *O. anisodorum*, F.v.M.; *O. caryophyllinum*, F.v.M.), N.O., Labiatæ, B.Fl., v., 74.

"Mooda," of the aboriginals of the Cloncurry River (North Queensland); "Bulla-bulla" of those of the Mitchell River.

The odour of the variety occurring in North Australia is similar to anise, while that of the East Australian variety resembles cloves. A pot herb.

Queensland and Northern Australia.

153. **Oryza sativa,** *Linn.*, N.O., Gramineæ, B.Fl., vii., 550.

"Rice." "Kineyah," of the aboriginals of the Cloncurry River (North Queensland).

Baron Mueller found this plant to be truly indigenous in Australia. It is so well-known that it need not be dwelt upon here.

Northern Australia and Queensland.

154. **Owenia acidula,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 385.

"Sour Plum," "Native Peach or Nectarine," "Emu Apple." "Mooley Apple" is a Western New South Wales name. Aboriginal names are "Rancooran," "Warrongan," and "Gruie-Colaine."

The sub-acid fruit of this tree relieves thirst. It is eaten both by colonists and aboriginals, and is of the size of a small nectarine.

South Australia, New South Wales, and Queensland.

155. **Owenia cerasifera,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 386.

"Queensland Plum," "Sweet Plum," "Rose Apple," "Rancooran."

This plant bears a fine juicy red fruit with a large stone. When fresh gathered it is very acid, but the Rev. J. E. Tenison-Woods states that on keeping, or better still, burying for a day or two in sand, it is both palatable and refreshing.

Queensland.

156. **Owenia venosa,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 386.

"Sour Plum," "Tulip Wood," "Mouliibie," of the aborigines of Southern Queensland; "Pyddharr," is another aboriginal name.

A beverage is produced by boiling the fruit, which, after going through certain processes, is denominated wine, and forms an agreeable beverage. (Hill.)

Queensland.

164. **Physalis minima,** *Linn.*, (Syn. *P. parviflora*, R.Br.), N.O., Solaneæ, B.Fl., iv., 466.

"Neen-gwan," of the aboriginals of the Cloncurry River (North Queensland).

The berries are eatable. The plant is not endemic in Australia. Another species is the well-known "Cape Gooseberry."

New South Wales, Queensland, and Northern Australia.

165. **Picris hieracioides,** *Linn.*, (Syn. *P. barbarorum*, Lindl.; *P. angustifolia*, DC.; *P. attenuata*, A. Cunn.; *P. asperrima*, Lindl.; *P. hamulosa*, Wall.), N.O., Compositæ, B.Fl., iii. 678. (Not in Muell. Cens.)

Sir Thomas Mitchell (*Three Expeditions*, ii., 149) thus speaks of this plant:—"Near our camp we found some recent fire-places of the natives, from which they must have hastily escaped on our approach, for in the branches of a tree they had left their net bags containing the stalks of a vegetable that had apparently undergone some culinary process, which gave them the appearance of having been half-boiled.

"Vegetables are thus cooked, I am told, by placing the root or plant between layers of hot embers, until it is heated and softened. The stalks found in the bag resembled those of the potato, and they could only be chewed, such food being neither nutritious nor palatable, for it tasted only of smoke."

This plant is not endemic in Australia.

All the colonies.

166 **Pipturus argenteus,** *Wedd.*, (Syn. *P. propinquus*, Wedd.; *Urtica gigantea*, Forst.), N.O., Urticeæ, B.Fl., vi., 185. *P. propinquus* in Muell. Cens., p. 22.

"Native Mulberry." "Kongangn," and "Coomeroo-coomeroo" of Queensland aboriginals.

The white berries are eaten by the aboriginals. (Thozet.)
This plant is not endemic in Australia.

New South Wales and Queensland.

167. **Pittosporum phillyræoides,** DC., (Syn. *P. angustifolium*, Lodd.; and others), N.O., Pittosporeæ, B.Fl., i., 112.

Called variously "Butter-bush," "Native Willow," and "Poison-berry Tree."

The seeds are very bitter to the taste, yet the aborigines in the interior were in the habit of pounding them into flour for use as food. (Tepper.)

In all the colonies except Tasmania.

168. **Podocarpus spinulosus,** *R.Br.*, (Syn. *P. asplenifolia*, Labill.; *P. pungens*, Caley; *Nageia spinulosa*, F.v.M.), N.O., Coniferæ, B.Fl., vi., 247. *N. spinulosa* in Muell. Cens., p. 109.

"Native Plum," or "Native Damson.

This shrub possesses edible fruit, something like a plum, hence its vernacular names. The Rev. Dr. Woolls tells me that, mixed with jam of the Native Currant (*Leptomeria acida*), it makes a very good pudding.

New South Wales.

169. **Portulaca napiformis,** *F.v.M.*, N.O., Portulaceæ, B.Fl., i., 169.

The tubers of this plant are used by the natives for food.

Queensland and Northern Australia.

170. **Portulaca oleracea,** *Linn.*, N.O., Portulaceæ, B.Fl., i., 169.

"Pigweed," or "Purslane," of England; "Thukouro," of the aboriginals of the Cloncurry River.

The seeds of this plant are largely used for food by the natives of the interior. One would suppose that so small a seed would scarcely repay the labour of collecting, but the natives obtain large quantities by pulling up the plants, throwing them in heaps, which after a few days they turn over, and an abundant supply of seed is found to have fallen out, and can be easily gathered up; the food prepared from this seed must be highly nutritious, for during the season that it lasts the natives get in splendid condition on it. The seeds are jet black and look like very fine gunpowder. The natives grind them in the usual mill (*i.e.*, a large flat-stone or bed-stone on which the seed is put, and a

176. **Salicornia australis,** *Soland.*, (Syn. *S. indica*, R.Br.), N.O., Chenopodiaceæ, B.Fl., v., 205.

The young shoots are pickled.

All the colonies.

177. **Sambucus Gaudichaudiana,** *DC.*, and **S. xanthocarpa,** *F.v.M.*, (Syn. *Tripetelus australasicus*, Lindl.), N.O. Caprifoliaceæ, B.Fl., iii., 398.

"Native Elderberry."

The fruit of these two native elders is fleshy and sweetish, and is used by the aborigines for food.

All the colonies except Western Australia (*S. Gaudichaudiana*); Victoria, New South Wales and Queensland (*S. xanthocarpa.*

178. **Santalum lanceolatum,** *R.Br.*, (Syn. *S. oblongatum*, R.Br.), N.O., Santalaceæ, B.Fl., vi., 214.

"Sandalwood" of the colonists. The "Tharra-gibberah" of the aboriginals of the Cloncurry River (North Queensland).

This tree produces a small purple fruit of very agreeable taste. (Leichhardt's *Overland Journey to Port Essington*, p. 95.)

All the colonies except Tasmania and Victoria.

179. **Scævola Kœnigii,** *Vahl*, (Syn. *S. Taccada*, Roxb.; *S. sericea*, Forst.; *S. Lobelia*, De Vr.; *S. macrocalyx*, De Vr.; *S. chlorantha*, De Vr.; *S. Lambertiana*, De Vr.; *S. montana*, Labill.), N.O., Goodeniaceæ, B.Fl., iv., 86.

It sometimes goes under the name of "Native Cabbage."

A large, succulent shrub, often met with along the sandy beach. It has large rich green foliage, and a vegetable might be made out of it. It is a common coast plant in the warmer parts of the world.

Queensland and Northern Australia.

180. **Schmidelia serrata,** *DC.*, (Syn. *S. timoriensis*, DC.; *Ornitrophe serrata*, Roxb.; *Allophyllus ternatus*, Lour.), N.O., Sapindaceæ, B.Fl., i., 455. *Allophyllus ternatus*, in Muell. Cens., p. 24.

Its small red, ripe berries are eaten in India. (*Cyclop. of India*).

Queensland and Northern Australia.

181. **Semecarpus Anacardium,** *Linn.*, (Syn. *S. australasicus*, Engl.), N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut" tree of India.

The thick fleshy receptacle bearing the fruit is of a yellow colour when ripe, and is roasted and eaten by the natives of India. The seeds, called Malacca-beans or Marsh nuts, are eaten. (*Treasury of Botany*). The Portuguese at Goa salt the green fruit and use them like olives. (Dymock). When fresh the fruit is dry and astringent—roasted, it is said to taste somewhat like roasted apples, and when dry somewhat like dates. (Brandis).

Queensland and Northern Australia.

182. **Sesbania aculeata,** *Pers.*, (Syn. *S. australis*, F.v.M.), N.O., Leguminosæ, B.Fl., ii., 213.

The "Nardoo" of the aboriginals of the Norman River, Queensland.

The natives of Northern Queensland make, or used to make, a bread of the seeds of this species. (See *Marsilea quadrifolia*).

"In North Queensland, according to Mr. T. A. Gulliver, the natives make bread of the seeds of *Sesbania aculeata*, Pers. I am of opinion that this is the true Nardoo of the Cooper's Creek natives. The unfortunate explorers (Burke and Wills) might easily have mistaken the spore cases of a *Marsilea* for the shelled-out seeds of *Sesbania*." (Bailey, in *Proc. Linn. Soc. N.S.W.*, 1880, p. 8).

South Australia, New South Wales, Queensland, Northern and Western Australia.

183. **Solanum aviculare,** *Forst.*, (Syn. *S. vescum*, F.v.M.; *S. laciniatum*, Ait.; *S. reclinatum*, L'Hér.), N.O., Solaneæ, B.Fl., iv., 448. In Muell. Cens., p. 95-6, *S. aviculare* and *S. vescum* are made separate species.

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The young shoots are pickled.

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"Native Elderberry."

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This tree produces a small purple fruit of very agreeable taste. (Leichhardt's *Overland Journey to Port Essington*, p. 95.)

All the colonies except Tasmania and Victoria.

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It sometimes goes under the name of "Native Cabbage."

A large, succulent shrub, often met with along the sandy beach. It has large rich green foliage, and a vegetable might be made out of it. It is a common coast plant in the warmer parts of the world.

Queensland and Northern Australia.

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Its small red, ripe berries are eaten in India. (*Cyclop. of India*).

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South Australia, New South Wales, Queensland, Northern and Western Australia.

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"Kangaroo Apple," "Gunyang," or "Koonyang" of the Gippsland and other aboriginals. "Meakitch" or "Mayakitch" or "Mookich" of the aboriginals of Western Victoria (Lake Condah).

Its large fruit resembles that of the potato. The fruit when perfectly ripe, which is indicated by the outer skin bursting, may be eaten in its natural state, or boiled and baked. It has a mealy, sub-acid taste, and may be eaten in any quantity with impunity; but until the skin bursts, although the fruit may otherwise appear ripe, it has an acrid taste, and causes an unpleasant burning sensation in the throat. (Gunn).

All the colonies except Western Australia and Queensland.

184. **Solanum esuriale,** *Lindl.*, (Syn. *S. pulchellum*, F.v.M.), N.O., Solaneæ, B.Fl., iv., 454.

"Comyn" of the aboriginals of the Lachlan River, New South Wales. "Oon-doroo" of those of the Cloncurry River, North Queensland.

The berries of this plant were eaten by the native guides of Sir Thomas Mitchell. (*Three Expeditions*, ii., 43).

All the colonies except Tasmania and Western Australia.

185. **Solanum hystrix,** *R.Br.*, N.O., Solaneæ, B.Fl., iv., 458.

Called "Walga" by aborigines in South Australia.

The blacks use the fruit for food, but only with the pounded and baked bark of the mallee root, called "Congoo" by them. Before using the fruit they take off the shell (the dry prickly calyx), and remove the seeds. This leaves a pulpy skin about the thickness of that of a native peach (*? Owenia*); the fruit and bark are then made into a cake. When fruits are not obtainable, and they are otherwise hard pressed for food, the natives bleed themselves in the arm, and use the blood with the bark. The natives told me, when opening the fruit for the seeds, not to eat the fruit, as it would make my throat sore, nor yet to touch my eyes with my fingers. The fine prickles and juice got into my fingers, and produced a good deal of pain and inflammation for a short time. (Annie F. Richards, in *Proc. R.S. S.A.*, iv., 136).

South Australia.

186. **Solanum simile,** *F.v.M.*, (Syn. *S. laciniatum*, var. R.Br., *S. fasciculatum*, F.v.M.), N.O., Solaneæ. B.Fl., iv., 448.

Called "Quena," by aboriginals in South Australia.

The blacks are fond of the fruit, but do not eat it until it has fallen to the ground. Both black and white men agree that to eat many will cause sickness. The fruit causes a hot burning taste in the mouth, but its scent reminds me of that of strawberries. (Annie F. Richards, *Proc. R.S.S.A.*, iv., 136.)

All the colonies, except Tasmania and Queensland.

187. **Sonchus oleraceus,** *Linn.*, (Syn. *S. asper*, Fuchs; *S. ciliatus*, Lam.; *S. fallax*, Wallr.), N.O., Compositæ, B.Fl., iii., 679. The genus *Sonchus* is omitted from Muell. Cens.

Commonly called "Sow-thistle." It is the "Thalaak" of the East Gippsland aborigines.

The stems and roots are eaten. (Hooker.) Leichhardt, in his *Overland Journey to Port Essington*, says that the young shoots of *Sonchus* made an excellent vegetable. This plant is not endemic in Australia.

Throughout the colonies.

188. **Sterculia diversifolia,** G. Don., (Syn. *Brachychiton populneum*, R.Br.; *Pœcilodermis populnea*, Schott.), N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton populneum* in Muell. Cens., p. 15.

"Black Kurrajong." The "Bottle-tree" of Victoria.

The tap-roots of young trees, and the young roots of old trees, are used as food by the aborigines. (Macarthur.) When boiled they have a flavour similar to that of turnips, but sweeter. The seeds of this and other species are edible, and make a good beverage.

Victoria, New South Wales, and Queensland.

189. **Sterculia quadrifida,** *R.Br.*, N.O., Sterculiaceæ, B.Fl., i., 227.

A "Kurrajong." "Calool," of the aborigines of northern New South Wales. "Convavola" is another aboriginal name.

The black seeds taste like filberts. As many as eleven of the brilliant scarlet fruits may be seen in a cluster, and each of

them may contain up to ten or eleven seeds. (Mueller.) The mucilaginous substance of the unripe fruit is also edible. (Thozet.)

Northern New South Wales, Queensland, and Northern Australia.

190. **Sterculia rupestris,** *Benth.*, (Syn. *Delabechea rupestris*, Lindl.; *Brachychiton Delabechii*, F.v.M.), N.O., Sterculiaceæ, B.Fl., i., 230. Noted as *Brachychiton Delabechii*, in Muell. Cens., p. 15.

A "Kurrajong." The "Bottle-tree" of N.E. Australia, and also called "Gouty-stem," on account of the extraordinary shape of the trunk. It is the "Binkey" of the aboriginals.

The stem abounds in a mucilaginous substance resembling pure tragacanth, which is wholesome and nutritious, and is said to be used as an article of food by the aborigines in cases of extreme need. A similar clear jelly is obtainable by pouring boiling water on chips of the wood.

"It is said that the soft juicy tissue of the stem can be eaten, and that many a wanderer in the bush has staved off hunger by its means. The young shoots and roots of young trees are agreeable and refreshing. The nuts also are eaten." (Thozet, also Tenison-Woods, *Proc. Linn. Soc. N.S.W.*, vol. vii., p. 573.

Thozet speaks of the natives cutting holes in the soft trunk, where the water lodges, and rots the trunk to its centre. These trunks are so many artificial reservoirs of water. When a tree has been cut its resources are not exhausted. The tired hunter, when he sees a tree that has been tapped, cuts a hole somewhat lower than the old cuts, and obtains an abundant supply of the sweet mucilaginous juice afforded by the tree.

Queensland.

191. **Sterculia trichosiphon,** *Benth.*, (Syn. *Trichosiphon australe*, Schott; *Brachychiton platanoides*, R.Br.), N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton platanoides* in Muell. Cens., p. 15.

"Ketey" of the aborigines.

The roots of young plants are eaten by the aborigines without any preparation. (Thozet.)

Queensland and Northern Australia.

192. **Styphelia adscendens,** *R.Br.*, N.O., Epacrideæ, B.Fl., iv., 146.

The fruit is eatable.

South Australia, Victoria, New South Wales, and Tasmania.

193. **Styphelia triflora,** *Andr.*, (Syn. *S. glaucescens*, Sieb.), N.O. Epacrideæ, B.Fl., iv., 147.

"Five Corners."

These fruits have a sweetish pulp with a large stone. They form part of the food of the aboriginals, and are much appreciated by schoolboys. When from a robust plant they are of the size of a large pea, and not at all bad eating.

New South Wales and Queensland.

194. **Suæda maritima,** *Dumort.*, (Syn. *S. australis*, Moq.; *Chenopodium maritimum*, Moq.; *S. australis*, Moq.; *Chenopodium australe*, R.Br.), N.O. Chenopodiaceæ, B.Fl., v., 206.

The fleshy leaves of this plant can be utilised for pickling. (Woolls.)

It is common on the sea coasts of most temperate and sub-tropical regions of the world.

Throughout the colonies.

195. **Tacca pinnatifida,** *Forst.*, N.O., Taccaceæ, B.Fl., vi., 458.

The root is very bitter when raw, but yields a great quantity of white fecula, of which good flour for confectionery is made. The fecula much resembles arrowroot, and is very nutritive. In Arracan the starch is, or was extracted for the China market. (*Pharm. Journ.*, vi., 383.)

Queensland and Northern Australia.

196. **Telopea speciosissima,** *R.Br.*, (Syn. *Embothrium speciosissimum*, Smith; *E. spathulatum*, Cav.; *E. speciosa*, Salisb.; *Hylogyne speciosa*, Knight), N.O., Proteaceæ, B.Fl., v.. 534.

"Waratah," or "Native Tulip."

So early as 1803 it was observed (Curtis's *Bot. Mag.*) that the natives make an agreeable repast by sucking the tubular flowers, which abound in honey. See *Banksia*.

New South Wales.

197. **Terminalia sp.,** N.O., Combretaceæ.

"We collected a great quantity of Terminalia gum, and prepared it in different ways to render it more palatable. The natives, whose tracks we saw everywhere in the scrub, with frequent marks where they had collected gum, seemed to roast it. It dissolved with difficulty in water; added to gelatine soup it was a great improvement. . . . But it acted as a good lenient purgative on all of us." (Leichhardt, *Overland Journey to Port Essington*, p. 374.)

198. **Terminalia Catappa,** *Linn.*, N.O. Combretaceæ, Muell. Cens., p. 50.

"Country Almond" of India.

This plant is also a native of India. The seeds are like almonds in shape and whiteness, but, though palatable, they have none of their peculiar flavour. (*Treasury of Botany.*)

Queensland.

199. **Terminalia oblongata,** *F.v.M.*, N.O. Combretaceæ, B.Fl., ii., 499.

"Yananoleu" of the aboriginals."

The purple fruit is edible.

Queensland.

200. **Tetragonia expansa,** *Murr.*, (Syn. *T. inermis*, F.v.M.), N.O., Ficoideæ, B.Fl., iii., 325.

"New Zealand Spinach."

This plant was introduced to England by Sir Joseph Banks on his return with Captain Cook from his first voyage round the world. As a substitute for summer spinach it has been

grown in private (English) gardens for many years past, and it yields a large produce, which in the hands of a skilful cook may be made an excellent vegetable dish, though inferior to spinach. The chief objection to it as a cooked vegetable is the abundance of mucilage, which gives it a somewhat slimy consistence. (*Treasury of Botany.*) It should be eaten when young, as when mature it possesses some acridity. It is already cultivated to some extent in Australian gardens, but it is abundantly wild at many parts of the coast.

All the colonies.

201. **Tetragonia implexicoma,** *Hook. f.*, (Syn. *Tetragonella implexicoma*, Miq.), N.O., Ficoideæ, B.Fl., iii., 326.

Called "Ice Plant" in Tasmania.

Baron Mueller suggests that this plant be cultivated for spinach.

All the colonies except Queensland.

202. **Timonius Rumphii,** *DC.*, (Syn. *Polyphragmon sericeum*, Desf.; *Guettarda polyphragmoides*, F.v.M.), N.O., Rubiaceæ, B.Fl., iii., 417.

"Kavor-kavor," of the aboriginals.

The aboriginals are particularly fond of this fruit, which has much the appearance of the crab or wild apple of Europe. (Thozet.)

Queensland and Northern Australia.

203. **Trigonella suavissima,** *Lindl.*, N.O., Leguminosæ, B.Fl., ii., 187.

"The perfume of this herb, its freshness and flavour, induced me to try it as a vegetable, and we found it to be delicious, tender as spinach, and to preserve a very green colour when boiled." (Mitchell, *Three Expeditions*, p. 554.) It is an excellent antiscorbutic.

All the colonies except Tasmania and Queensland.

204. **Typha angustifolia,** *Linn.*, (Syn. *T. Brownii*, Kunth.; *T. latifolia*, G. Forst.; *T. Shuttleworthii*, Sond.); N.O., Typhaceæ, B.Fl., vii., 159. Muell. Fragm., vii., 116.

Called "Bullrush," and also "Cat's Tail" and "Reed Mace." It is the "Wonga" of the Lower Murray aboriginals.

The young shoots are edible, and resemble asparagus. The root is excellent. The pollen is used as food by the natives of Scinde, India, being made into cakes. (Dymock). It is used for the same purpose in New Zealand.

In a paper by Gerard Krefft (*Proc. Philos. Soc. N.S.W.* 1862-5) "On the Lower Murray Aboriginals," the following description is given by him of the method of preparing these roots for food. He gives the species name as *T. Shuttleworthii*, but this has been merged in the present species:—"At a certain period, I believe January and February, the women enter the swamps, take up the roots of these reeds, and carry them in large bundles to their camp. The roots thus collected are twelve to eighteen inches in length, and they contain, besides a small quantity of saccharine matter, a considerable quantity of fibre. The roots are roasted in a hollow made in the ground, and either consumed hot or taken as a sort of provision upon hunting expeditions; they are at best a miserable apology for flour, and I almost believe it was on account of the tough fibre thus obtained that these roots were made an artcle of food."

This plant is also termed the "Asparagus of the Cossacks," the Cossacks of the Don being very fond of it. They prepare it like asparagus, and cut it, like the latter, when the young shoots are pushing; the tender blanched part is boiled in water seasoned with salt, and served up in the same way as asparagus. The various culinary preparations to which asparagus is subjected are suitable for *Typha latifolia.* In collecting it they peel off the cuticle, and select the blanched tender part, usually about eighteen inches in length, near the root, and this constitutes a dish cool, agreeable and wholesome. (*Pharm. Journ.*, vii., 543).

For notes on the economic value of this plant, see also *Proc. R.S. Tasmania*, 1882, p. 163.

100 parts of the entire plant contain, after drying, 9·58 per cent. ash; and the ash contains, in 100 parts :—

Potash	14.8
Lime	21.9
Magnesia	1.56
Ferric Oxide	0.2
Sulphuric Anhydride	2.5
Silica	0.6
Carbonic Acid	21.0
Phosphoric Pentoxide	3.9
Potassium Chloride	16.8
Sodium Chloride	16.9

(Schulz-Fleeth, *Watt's Dict.*, v., p. 930).

The pollen contains:—

Stearin and Olein	3.6 per cent.
Sugar	18.3
Starch	2.0
Pollenin	25.0
Magnesium and Potassium Phosphates, together with small quantities of other potassium salts	2.5
Silica	0.4

The root-stock contains, in the fresh state, according to Lecocq, in December, 12.5 parts starch to 73 parts water; but in April only 10.5 parts starch to the same quantity of water.

A decoction of the root is said to be used in Turkey as a remedy for dropsy and snake-bites. (Landerer, *Watts' Dict.*, v., 930).

"Balyan" *(Typha angustifolia?)*

"The principal food of the inhabitants of the Kalaire, or Lachlan, appeared to be 'balyan,' the rhizome of a monocotyledonous plant or bulrush growing amongst the reeds. It contains so much gluten, that one of our party, Charles Webb, made, in a short time, some excellent cakes of it; and they seemed to me lighter and sweeter than those prepared from common flour. The natives gather the roots and carry them on their heads in great

bundles within a piece of net. . . . And, indeed, this was obviously their chief food among the marshes." (Mitchell, *Three Expeditions*, ii., 61.)

Throughout the colonies.

205. **Typhonium Brownii,** *Schott*, (Syn. *Arum orixense*, R.Br.,) N.O., Aroideæ, B.Fl., vii., 154.

"Merrin" of Central Queensland aboriginals.

The tubers, which are yellow inside, are manipulated in the same way as those of *Colocasia macrorrhiza* (No. 51, q.v.),, but none are watery, and they are made to adhere together after the first roasting.

New South Wales to Northern Australia.

206. **Vigna lanceolata,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 260.

This twiner produces, along with the ordinary cylindrical pods, others underground from buried flowers, and these somewhat resemble common ground or pea-nuts. (O'Shanesy.)

South Australia, New South Wales, Queensland, Northern and Western Australia.

207. **Vitis hypoglauca,** *F.v.M.*, (Syn. *Cissus hypoglauca*, A. Gray; *C. australasica*, F.v.M.), N.O., Ampelideæ, B.Fl., i., 450.

"Native Grape," "Gippsland Grape."

This evergreen climber yields black edible fruits of the size of small cherries. This grape would perhaps be greatly improved by culture. (Mueller.)

Mr. Bidwill's life was saved when he was lost in the bush by the water he was able to procure by incising one of these vines. (Dr. George Bennett.)

Victoria, New South Wales, and Queensland.

208. **Vitis opaca,** *F.v.M.*, (Syn. *Cissus opaca*, F.v.M.), N.O., Ampelideæ, B.Fl., i., 450.

"Burdekin Vine," "Round Yam." "Yaloone" is the aboriginal name (Qentral Queensland) for the large ones, and "Wappoo-wappoo" for the small ones.

The tubers are very numerous, and some weigh from five to ten pounds. They are eaten after immersion in hot water like water-melons (the small and young ones are the best); they are, however, difficult to digest. (Thozet.)

It is probably the yam alluded to by Leichhardt (*Overland Expedition to Port Essington*, p. 150). "Both tubers and berries had the same pungent taste, but the former contained a watery juice which was most welcome to our parched mouths.'

New South Wales and Queensland.

209. **Xanthorrhea, spp.**, N.O., Juncaceæ.

"The bases of the inner leaves of the grass-tree are not to be despised by the hungry. The aborigines beat off the heads of these singular plants by striking them about the top of the trunk with a large stick; then they stript off the outer leaves and cut away the inner ones, leaving about an inch and a-half of the white tender portion joining the trunk; this portion they ate raw or roasted, and it is far from disagreeable in flavour, having a nutty taste, slightly balsamic." (Backhouse.)

The centre of the stem contains about five per cent. of sugar.

"The interior or pith of the tree is broken up. It is then subjected to hydraulic pressure, when a copious flow of the saccharine juice takes place. About twenty gallons to the ton are obtainable. On distillation this quantity of raw juice yields four gallons of proof spirit." (Ligar, *Trans. R.S. Victoria*, 1866).

In the year 1876 an application (which lapsed) was made at the Patent Office, Melbourne, for a patent for making sugar from *X. hastilis*. Following is the specification:—"The substance used is the inner white or cellular portion of the plant. This is submitted to pressure, mechanical or hydraulic. The juice expressed is boiled till a scum rises to the surface. This scum is skimmed off, lime being used to assist in the operation. After clarification, the juice is filtered through animal charcoal, and

again boiled. The clear syrup thus produced may then be crystallised and manipulated by the process used to produce sugar from cane."

Throughout the colonies.

210. **Ximenia americana,** *Linn.*, (Syn. *X. elliptica*, Forst.; *X. laurina*, Del.; *X. exarmata*, F.v.M.), N.O., Olacineæ, B. Fl., i., 391. *X. elliptica*, in Muell. Cens., p. 63.

This plant bears round orange-coloured fruits, of which the natives of the South Sea Islands are very fond, though they are rather tart. (*Treasury of Botany.*) Before they are ripe they possess a powerful odour of essential oil of almonds.

211. **Zizyphus Jujuba,** *Lam.*, N.O., Rhamneæ, B.Fl., i., 412.

"Jujube Tree" of India. "Balyan" is an aboriginal name, but, of course, different to the "Balyan" of p. 65.

This tree yields an excellent dessert fruit, and is largely cultivated by the Chinese, who recognise a great number of varieties, differing in the shape, colour and size of the fruits. (*Treasury of Botany.*) In India it is much cultivated.

Queensland.

212. **Zizyphus Œnoplia,** *Mill.*, (Syn. *Z. celtidfolia*, DC.; *Z. rufula*, Miq.; *Z. Napeca*, Roxb.), N.O., Rhamneæ, B.Fl., i., 412.

In India the fruit is eaten by the natives, its taste being pleasantly acid, and it is a great favourite with the thirsty traveller; mice are fond of it. (*Cyclop. of India.*)

Northern Australia.

APPENDIX.

Anoplognathus cereus. (See **Eucalyptus corymbosa.**)

I cannot, up to the present, trace any account of this species of *Anoplognathus.*

Cicada moerens. The "Great black or Manna Cicada."

In the *Prodromus of the Zoology of Victoria*, by Prof. McCoy, Decade V., Plate 50, will be found admirable drawings of this insect, and also a full account of its life-history. From this source the few particulars following are taken :—

The young resemble fleas in size and shape; they quickly reach the ground, into which they burrow, and whence they may be dug out at the roots of trees any time during the larval and pupa states. The larva is white, and seems to feed on underground roots; the eyes, six legs, and antennæ agreeing with the pupa, which chiefly differs in having the rudimentary wings visible at the sides of the body. The pupæ ultimately come out of the ground, crawl up a few feet on the trunk of the nearest gum-tree in the night, and then, splitting along the back, the surprisingly larger, winged, perfect insect creeps out, leaving the empty pupa skin clinging to the tree quite perfect, even to the smallest hair or other part, in the position of life. . . . Both sexes have short lives in the perfect state, and may be seen lying about the ground under the trees, dead or dying in abundance, after their noisiest few days. This particular species chiefly frequents *Eucalyptus viminalis.*

Psylla Eucalypti. A homopterous insect which, on the leaves of *Eucalyptus dumosa,* produces "Lerp Manna" (q.v). This and many other species are in the preparatory stages covered with a white cottony secretion, and their excrement forms threads or masses of a gummy sucreous nature.

See a paper by Thos. Dobson, B.A., in the *Proc. R.S. Van Diemen's Land* of 1851, on the life-history of this insect. Excellent plates and full particulars of its life-history are given. A reprint of a paper by Dr. Anderson, of Edinburgh, on the same subject appears in the same volume.

FORAGE PLANTS.

A. GRASSES,*

OR

NATURAL ORDER *GRAMINEÆ.*

A few grasses, not useful as fodder plants, but having miscellaneous uses, have been placed here for convenience.

Hardly any group of plants is so variable as the present one, hence the different statements made by different authors in regard to some of the species.

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1. **Agropyrum scabrum,** *Beauv.*, (Syn. *Festuca scabra*, Labill.; *F. rectiseta*, *F. Browniana*, *F. Billiardieri*, *Anthosachne australasica*, Steud.; *Triticum scabrum*, R.Br.; *Vulpia rectiseta*, *V. Browniani*, *V. scabra*, *V. Brauniana*, Nees.), B.Fl., vii., 665. *Agropyron* in Muell. Cens., p. 135.

This grass is a good winter species. It stands the drought well. It is rather coarse, growing plentifully on rich soil; it is not much relished by stock, but is eaten when young. The seeds are very injurious to sheep, often causing blindness by penetrating their eyes. They deteriorate wool greatly.

It has been rather differently described as follows:—"A perennial grass; grows about two feet in height; does not perfect its seed well; produces plenty of tender foliage, and is not much affected by dry seasons, or easily injured by overstocking. It is a valuable grass."

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* I am indebted to Mr. Frederick Turner, Superintendent of Hyde Park Gardens, Sydney, for some of the notes on grasses.

Differences in soil and latitude affect some grasses greatly. Absence of these particulars in reports on individual species often causes their reconcilement to be a matter of difficulty.

All the colonies.

2. **Agropyrum velutinum,** *Nees.*, (Syn. *Triticum velutinum*, Hook. f.), B.Fl., vii., 665.

Annual; seeds in October and November. This species is not much relished by stock, when other and more palatable kinds are obtainable. It grows plentifully on black soil, or on ground liable to inundation.

Tasmania, Victoria, and New South Wales.

3. **Agrostis scabra,** *Willd.*, (Syn. *A. parviflora*, R.Br.; *A. intricata*, Nees; *A. laxiflora*, Rich.; *Trichodium laxiflorum*, Mich.), B.Fl., vii., 576.

"Slender Bent Grass."

A slender tufted, glabrous grass, of delicate, succulent habit. It is useful, in spite of the prejudice which exists against species of the grass.

In all the colonies except Western Australia and Queensland.

4. **Alopecurus geniculatus,** *Linn.*, (Syn. *A. australis*, Nees; *A. paniceus*, Œder). B.Fl., vii., 555.

"Knee-jointed Fox-tail Grass."

A delicate annual spring grass, growing around shallow pools of water. It is much relished by stock of all kinds and is very nutritious, but unfortunately is of short duration, withering off on the advent of hot weather. It seeds in September and October. It should be observed that the opinions of some British authors in regard to the value of this grass are contradictory.

5. **Amphibromus Neesii,** *Steud.*, (Syn. *Avena nervosa*, R.Br.; *Danthonia nervosa*, Hook.), B.Fl., vii., 589. Noted as *Danthonia nervosa* in Muell. Cens., p. 134.

A tall succulent, perennial grass, growing in and aroun shallow pools of water; it is of rather a fugitive nature, but durin its existence stock of all kinds are exceedingly fond of it. I seeds in September and October.

All the colonies except Queensland.

6. **Amphipogon strictus,** *R.Br.*, (Syn. *A. caricinus*, F.v.M.; *A. Brownei*, F.v.M.; *Ægopogon strictus*, Beauv.), B.Fl., vii., 597.

A short, close-growing, perennial grass, growing on rich loamy soil. Although attractive-looking from its vivid greenness, it is not much eaten by stock whilst other more palatable kinds are obtainable. Drought-resisting, and valuable when other kinds are scarce. Seeds from October to January.

All the colonies except Tasmania.

7. **Andropogon affinis,** *R.Br.*, B.Fl., vii., 530.

A good open pasture grass, which will stand close feeding. It is a perennial dwarf-growing species; it stands drought well, and on that account is valuable. It yields a fair amount of fodder.

New South Wales and Queensland.

8. **Andropogon annulatus,** *Forsk.*, B.Fl., vii., 531.

"Blue Grass."

Recommended as a meadow grass. It is both a summer and winter grass. It does not grow fast in winter, but at the period of its greatest growth it sends up an abundance of herbage. It is of an upright habit of growth.

South Australia, Victoria, Queensland, and Northern Australia.

9. **Andropogon bombycinus,** *R.Br.*, B.Fl., vii., 533.

"Woolly-headed Grass."

A valuable pasture grass, highly spoken of by stockowners, and said to be very fattening. (Mr. P. A. O'Shanesy, however, states that it is not at all relished by stock.) The bases of the

stems of this species, like those of several others of the genus, are highly aromatic.

All the colonies except Tasmania.

10. **Andropogon erianthoides,** *F.v.M.*, B.Fl., vii., 529.

A very superior grass, and stock are considered to thrive better upon it than upon most others. It produces a heavy crop of rich, succulent herbage, much relished by all descriptions of stock. It spreads from the roots, and also seeds freely.

"It would be hard to find a superior grass to this, for even when eaten close to the ground, stock are said to do better on this than on any other of our indigenous species." *(Bailey).*

New South Wales and Queensland.

11. **Andropogon intermedius,** *R.Br.*, B.Fl., vii., 531. (Syn. *A. inundatus*, F.v.M.)

A strong, erect-growing grass, yielding a quantity of feed during the summer months.

All the colonies except Tasmania.

12. **Andropogon lachnatherus,** *Benth.*, (Syn. *A. procerus*, F.v.M. ; *A filipendulinus*, Hoch.), B.Fl., vii., 534.

Produces a heavy crop of grass relished by stock ; found on low, wet soils.

New South Wales and Queensland.

13. **Andropogon pertusus,** *Willd.*, B.Fl., vii., 531.

"Blue Grass."

Good for pasture, and very generally distributed. It stands drought well, and is a fair winter grass. if the weather is not too severe. It is very highly prized. It is not endemic in Australia.

South Australia, Victoria, New South Wales, and Queensland.

14. **Andropogon refractus,** *R.Br.*, B.Fl., vii., 534.

"Kangaroo Grass."

A grass said to be excellent for either pasture or hay. It is a very productive summer grass, but makes little growth during the

winter, unless upon sheltered forest land. Its roots have a strong aromatic flavour.

"It was usually a coarse jungle-grass, more like a rush or sedge, and often completely concealing the horses. The species was most commonly *Andropogon refractus*, a worthless, weedy grass, only good when young and green. In the dry state the horses would not touch it." (Tenison-Woods, *Explorations in Northern Australia.)*

Victoria, New South Wales, and Queensland.

15. **Andropogon sericeus,** *R.Br.*, (Syn. *A. chrysatherus*, F.v.M.; *A. annulatus*, F.v.M.), B.Fl., vii., 529.

"Blue Grass."

This grass yields enormously during the summer months, but not being permitted to seed, as it requires to do every few years, it is now becoming scarce. It is one of the most esteemed of our pasture grasses, beloved by all herbivorous animals. It grows on rich, loamy soil, and seeds in October and November. It is per ennial.

All the colonies, except Tasmania.

16. **Anthistiria avenacea,** *F.v.M.*, (Syn. *A. basisericea*, F.v.M.), B.Fl., vii., 543.

"Oat Grass," A "Kangaroo Grass."

In parts it is one of the most productive grasses in Australia, and (unlike other kangaroo grasses) it possesses the advantage of being a prolific seeder. It is nutritious and perennial, and produces a large amount of bottom-fodder. It seeds in November and December, is peculiar to the back country, and is found only on the richest soil, only in a few places, and there over a limited area. It grows in small detached tussocks; the leaves or blades are eaten by stock, but the seed-stalks are left standing.

All the colonies, except Tasmania.

17. **Anthistiria ciliata,** *Linn.*, (Syn. *A. australis*, R.Br.; *A. cæspitosa*, Anders.; *A. cuspidata*, Anders.), B.Fl., vii., 542.

"Common Kangaroo Grass."

A tall, perennial, upright-growing grass, often three feet in height. The roots are strong, fibrous, and penetrating. It is found in all parts of Australia, forms but few perfect seeds, and these do not germinate freely. It is one of the finest and most useful of the indigenous grasses. It remains green during the summer, but turns a little brown during the autumn, when its nutritive qualities are at the highest. Horses keep in better condition on this grass, doing hard work, than on almost any other species of native grass. Hooker wrote, in 1859: "This is the best fodder-grass in Australia." Although in the eastern portions of New South Wales, and also of Victoria, this is looked upon as a good pasture grass, it is not much esteemed in western New South Wales, and is not relished by stock. It is very restricted in its habitat, being found chiefly in the back country, and there to a limited extent, and only on the richest soils; in fact, the only situations in New South Wales in which it is largely found are the small rich alluvial flats, found in the gorges and valleys of the rocky hills between the Lachlan and Darling. In such places it grows very rank and luxuriant, and perhaps for this reason is not liked by stock. It seeds in November.

Baron Mueller says: "This is an excellent grass for stock, and makes a larger amount of bottom-feed than the other kangaroo grasses. Its growth should be encouraged by every means."

It contains:—

Albumen	2·05 per cent.
Gluten	4·67
Starch	0·69
Gum	1·67
Sugar	3·06

(F.v.M., and L. Rummel).

All the colonies.

18. **Anthistiria frondosa,** *R.Br.*, N.O., Gramineæ, B.Fl., vii., 542.

"Broad-leaved Kangaroo Grass."

A most useful grass, to judge by the manner stock feed it down when young. (Armit.)

Etheridge River (Queensland), and Northern Australia.

19. **Anthistiria membranacea,** *Lindl.*, (Syn. *Iseilema Mitchellii*, Anders.), B.Fl., vii., 543.

"Barcoo Grass" of Queensland; called also "Landsborough Grass."

One of the best pasture grasses in Queensland. It is exceedingly brittle when dry, and stock are so fond of it that they are sometimes found licking the broken parts from the ground. It seeds freely, and is particularly fitted for dry hot pastures, even of desert regions. It is a quick-growing summer species. It is fattening. Others remark that on account of its being so thinly scattered on stiff clayey soils on the plains only, it is seldom eaten by stock, and is consequently of little value. Annual; seeds in November.

West and South Australia, New South Wales and Queensland.

20. **Aristida arenaria,** *Gaudich*, (Syn. *A. contorta*, F.v.M.; *Arthratherum arenarium*, Nees.); B.Fl., vii., 561.

A dry wiry grass, bad for sheep on account of its sharp seeds. It is perennial, and seeds in October and November.

All the colonies except Tasmania.

21. **Aristida calycina,** *R.Br.*, B.Fl., vii., 563.

A dry, coarse, wiry grass, not relished by stock. It grows on sandhills in detached tussocks. It is only eaten in times of scarcity, and is of little value. The seeds are injurious to wool. It is perennial, and seeds in November and December.

All the colonies except Tasmania and Western Australia.

22. **Aristida depressa,** *Retz.*, (Syn. *A. vulgaris*, Trin.), N.O., Gramineæ, B.Fl., vii., 563.

Perennial; seeds in October and November. A rather coarse grass, growing on sandy or light loamy soils, and not much liked by stock.

New South Wales and Queensland.

23. **Aristida leptopoda,** *Benth.*, B.Fl., vii., 562.

A grass yielding a fair amount of fodder; found growing on rich soils.

All the colonies, except Tasmania and Western Australia.

24. **Aristida stipoides,** *R.Br.*, N.O., Gramineæ, B.Fl. vii., 561.

A coarse, perennial grass, seeding in November growing on sand-hills, and not relished by stock.

All the colonies, except Victoria and Tasmania.

25. **Aristida vagans,** *Cav.*, (Syn. *A. ramosa*, Sieb.; *A. parviflora*, Steud.), B.Fl., vii., 562.

A superior grass to *A. calycina*, though perhaps that is not saying much. It keeps green in the winter. It is an annual; seeds in October and November; is an exceedingly coarse species; grows plentifully on sand-hills, and is only eaten by stock in times of scarcity.

Victoria, New South Wales and Queensland.

26. **Arthraxon ciliare,** *Beauv.*, (Syn. *Batratherum echinatum*, Nees.; *Andropogon echinatus*, Heyne); N.O., Gramineæ, B.Fl., vii., 524.

A broad-leaved, creeping grass, found about swamps.

New South Wales and Queensland.

27. **Arundinella Nepalensis,** *Trin.*, (Syn. *Acratherum miliaceum*, Link.), B.Fl., vii., 545.

A grass well adapted for hay. On the Darling Downs, under cultivation, it has been cut three times during the season. In some districts it yields a fair amount of fodder, in others it is of a dry, coarse nature. It is not endemic in Australia.

Throughout Queensland.

28. **Astrebla elymoides,** *Bail., et F.v.M.*, p. 660, *Synop. Queensland Flora* (Bailey).

"True Mitchell Grass."

A strong-growing grass, the flowering spike resembling ears of wheat; is said to have highly fattening qualities. It is used as food by the natives. It is one of our best pasture grasses, and springs from every joint after rain; it will stand well through the droughts, and is highly spoken of by all stockowners. The most valuable fodder grass in Queensland.

"I met this grass on the Warrego in 1876, when it was almost the only grass showing any vitality." (Bailey).

Queensland.

29. **Astrebla pectinata,** *F.v.M.* (Syn. *Danthonia pectinata*, Lindl). B.Fl., vii., 602.

"A Mitchell Grass."

This is a valuable grass; it stands the drought well, and is sought greedily after by stock. It is a perennial desert species, and very fattening. It is often spoken of very favourably by the squatters of Northern Queensland. It seeds in October and November.

South Australia, New South Wales and Queensland.

30. **Astrebla triticoides,** *F.v.M.*, (Syn. *Danthonia triticoides*, Lindl). B.Fl., vii., 602.

"Mitchell Grass."

A strong growing grass. The flowering spikes resemble ears of wheat, and are said to have highly fattening qualities. It is somewhat wiry, and grows on stiff clayey soil. It is readily eaten by stock, but is by no means plentiful. It is perennial, and seeds in November and December.

South Australia, New South Wales and Queensland.

31. **Astrebla triticoides,** var. **lappacea,** *F.v.M.*, (Syn. *Danthonia lappacea*, Lindl).

This grass, although of a coarser nature than *A. pectinata*, possesses the same characteristics, and from the well-known fattening and drought-resisting qualities of both species, they are deserving of cultivation. Seed has been sent to America for trial in the Southern States.

Central Australia.

32. **Bromus arenarius,** *Labill.*, (Syn. *B. australis*, R.Br). B.Fl., vii., 661.

"Wild Oats." "Sea-side Brome-grass."

An annual early spring grass, very rare in Queensland; in other colonies it is more abundant. It makes its growth during

winter and early spring. It makes excellent hay. Seeds August to October. It is a delicate species, growing on rich moist soil; is of an exceedingly fugitive nature, withering off quickly on the advent of dry weather.

Buchanan (*Indigenous Grasses of New Zealand*) speaks of it as a common sea-side weed, which from its dry woolly nature is very unpalatable to all kinds of stock. Some authorities, however, state that cattle are fond of it.

All the colonies except Tasmania.

33. **Cenchrus australis,** *R.Br.*, (Syn *C. echinatus*, var. Trin.), B.Fl., vii., 497.

This grass affects moist banks, and is very nutritious, but its long spikes of clinging seeds prevent cattle from feeding on it. (O'Shanesy.)

New South Wales and Queensland.

34. **Chionachne cyathopoda,** *F.v.M.*, (Syn *Sclerachne cyathopoda*, F.v.M.), B.Fl., vii., 516.

It is a valuable fodder grass, yielding a large return.

Tropical and Eastern sub-tropical Australia.

35. **Chloris acicularis,** *Lindl.*, (Syn. *C. Moorei*, F.v.M.), B.Fl., vii., 612.

"Lesser Star Grass."

Similar to *C. divaricata*, and grows on similar soil. It seeds in November and December.

All the colonies, except Tasmania.

36. **Chloris divaricata,** *R.Br.*, B.Fl., vii., 612.

"Dog-tooth Star Grass."

An early grower, and although the stalks appear dry, it yields a quantity of nutritious feed. The flower panicles give it an uninviting appearance. It is a succulent and highly relished perennial summer grass, growing thickly on rich, loamy soil, and seeds in November and December.

Queensland and Northern Australia.

37. **Chloris scariosa,** *F.v.M.*, B.Fl., vii., 614.

Particularly recommended as a pasture grass. It is scarce out of the Rockhampton district. (Bailey.)

Tropical Australia.

38. **Chloris truncata,** *R.Br.*, B.Fl., vii., 612.

"Windmill Grass."

An erect species, found in Queensland, on the Condamine River. It is perennial and showy, an excellent summer and autumn grass, of ready growth, and relished by stock.

All the colonies, except Tasmania and Western Australia.

39. **Chloris ventricosa,** *R.Br.*, (Syn. *C. sclerantha*, Lindl.), B.Fl., vii., 613.

"Blue Star Grass."

An erect, quick-growing species, found along the borders of scrubs. It produces a large quantity of leafy feed.

New South Wales and Queensland.

40. **Chrysopogon Gryllus,** *Trin.*, (Syn. *Andropogon Gryllus*, Linn., *Holcus Gryllus*, Trin.); B.Fl., vii., 537. Noted in Muell. Cens., p. 132, as *Andropogon Gryllus*.

An excellent pasture grass, easily recognised by its golden beard. It produces a large quantity of feed during the summer months. It is not endemic in Australia.

All the colonies, except Tasmania.

41. **Chrysopogon parviflorus,** *Benth.*, (Syn. *C. violascens*, Trin.; *C. montanus*, Trin.; *Andropogon montanus*, Roxb.; *A. micranthus*, Kunth.; *Holcus parviflorus*, R.Br.; *H. cœrulescens*, Gaud.; *Anatherum parviflorum*, Spreng.; *Sorghum parviflorum*, Beauv.); B.Fl., vii., 538. Referred to in Muell. Cens., p. 132, as *Andropogon montanus*.

"Scented Grass."

A tall, strong-growing, coarse grass, deep-rooted, and of stoloniferous habit. It is partial to rich flats. The flower panicles possess a peculiar perfume. It is of too dry a nature to be of

value for fodder. Mr. P. A. O'Shanesy however states that cattle are fond of it.

Victoria to Northern Australia.

42. **Cynodon dactylon,** *Pers.*, (Syn. *Panicum dactylon*, Linn.; *Digitaria stolonifera*, Schrad.); B.Fl., vii., 609.

"Indian Doub Grass," "Couch Grass."

This is generally considered an introduced grass, but it is, however, indigenous. It is good for pasture, especially when mixed with white clover. Sheep are very fond of it. It is a most troublesome weed in cultivated places.

All the colonies except Tasmania.

43. **Cynodon tenellus,** *R.Br.*, (Syn. *C. altior*, F.v.M.); B.Fl., vii., 609.

This is one of the creeping grasses. It makes a quantity of feed during summer. Stock are fond of it.

Queensland.

44. **Danthonia bipartita,** *F.v.M.*, (Syn. *Monachather paradoxus*, Steud.); B.Fl., vii., 592.

Available as a tender-leaved and productive perennial grass for arid country. Mr. Buchanan *(Indigenous Grasses of New Zealand)*, remarks that the *Danthonias* seem to possess an inherent recuperative power, which enables them at any time, when the destroying agency is removed, to renew their growth, and spread in abundance. This may be partly ascribed to their capacity of ripening abundance of seed, and their ready adaptation to climatic changes and difference of soil.

All the colonies except Tasmania.

45. **Danthonia longifolia,** *R.Br.*, B.Fl., vii., 593. United in Muell. Cens., p. 134, with other species to form *D. penicillata.*

"White-topped Grass."

This grass is of a wiry nature on the Darling Downs (Queensland), but on the coast it yields a fair amount of fodder.

Southern Queensland and New South Wales.

46. **Danthonia pallida,** *R.Br.*, B.Fl., vii., 593. United in Muell. Cens., p. 134, with other species to form *D. penicillata.*

"Silver Grass."

A fine useful, drought-resisting species, growing plentifully in stiff clayey soil, and much relished by stock of all descriptions. It is perennial, and seeds in September and October.

Throughout Australia.

47. **Danthonia penicillata,** *F.v.M.*, B.Fl., vii., 592. Baron Mueller's name to include *D. pallida*, *D. longifolia*, *D. robusta*, *D. racemosa*, *D. pilosa*, *D. semiannularis*, *D. setacea*, *D. pauciflora*; but Bentham, while conceding that some of them may require further investigation, considered they should at least be distinguished as marked races.

"Wallaby Grass."

This perennial grass is useful for artificial mixed pasture. It is principally valuable in spring. It is one of the most variable of grasses.

Throughout Australia.

48. **Danthonia racemosa,** *R.Br.*, B.Fl., vii., 594. (See *D. penicillata*, under which species this is included by Baron Mueller.)

"Mulga Grass."

Peculiar to the back country. It derives its vernacular name from being only found where the Mulga-tree (*Acacia aneura* and other species) grows; it is a very nutritious and much esteemed grass. Perennial; seeds in October and November.

49. **Danthonia robusta,** *F.v.M.*, B.Fl., vii., 593. United by Baron Mueller, Cens., p. 134, with other species to form *D. penicillata.*

Forms large patches of rich foliage at the very edge of glaciers.

Australian Alps (Victoria and New South Wales).

50. **Deyeuxia Forsteri,** *Kunth.*, (Syn. *Agrostis Solandri*, F.v.M.; *A. Forsteri*, Rœm. et Schult; *A. æmula*, R.Br.; *A. retrofracta*, Willd.; *A. semibarbata*, Trin.; *A. debilis*, Poir;

Lachnagrostis retrofracta, Trin. ; *L. Willdenowii*, Trin. ; *Calamagrostis æmula*, Steud.; *C. Willdenowii*, Steud) ; B.Fl., vii., 579. Noted as *Agrostis Solandri* in Muell. Cens., p. 133.

"Toothed Bent Grass."

Produces a large quantity of sweet fodder in damp localities, valuable for pastures. It is essentially a winter-grass, dying out on the approach of summer.

Its percentage composition is :—

Albumen	4.08
Gluten	8
Starch	1 34
Gum	2.50
Sugar	9.75

(Mueller and Rummel).

It seeds in September and October. Some authorities say that it is rather a coarse grass, and not much relished by stock, but is eaten while young. Its pointed seeds are very injurious to wool, and frequently cause blindness.

All the colonies.

51. **Dichelachne crinita,** *Hook, f.*, (Syn. *D. Hookeriana*, Trin. ; *D. Forsteriana*, Trin. ; *D. comata*, Trin. ; *D. longiseta*, Trin. ; *D. vulgaris*, Trin. ; *Anthoxanthum crinitum*, Linn. ; *Agrostis crinita*, R.Br. ; *Muehlenbergia crinita*, Trin. ; *M. mollicoma*, Nees ; *Apera crinita*, Palisot), B.Fl., vii., 574.

"Long-hair Plume Grass."

A good winter species which grows quickly and bears abundance of seed.

"It is a valuable grass, and forms, when in flower, a prominent feature in pasture. As a pasture grass, when grown under favourable circumstances on rich valley bottoms with perennial moisture, it is very succulent, but when on dry clay hills it is harsh and scanty ; its nutrient qualities may be admitted, forming as it does a large constituent of pastures famous for fattening stock. As a fodder grass it possesses considerable bulk, and would add

much value to a mixed crop of hay. (Buchanan, *Indigenous Grasses of New Zealand*).

All the colonies.

52. **Dichelachne sciurea,** *Hook. f.*, (Syn. *D. Sieberiana*, Trin.; *D. vulgaris*, Trin.; *D. montana*, Endl.; *Agrostis sciurea*, R.Br.; *A. rara*, Nees.; *Muehlenbergia sciurea*, Trin.; *Stipa Dichelachne*, Steud.); B.Fl., vii., 574. *Vide* also Muell. Fragm., viii., 105.

"Short-hair Plume Grass."

One of the best winter grasses; a quick grower, and an abundant seeder. It is of slender, succulent habit, and would become valuable as a fodder plant, if cultivated. It is a small, tufted, glabrous species.

New South Wales and Queensland.

53. **Diplachne fusca,** *Beauv.*, (Syn. *Festuca fusca*, Linn.; *Leptochloa fusca*, Kunth; *Triodia ambigua*, R.Br.; *Uralepis fusca*, Steud.; *U. Drummondii*, Steud.); B.Fl., vii., 619.

This species is found in low, wet ground; it yields a succulent herbage relished by stock. It is a highly nutritious perennial grass, and seeds in October and November.

All the colonies except Tasmania.

54. **Diplachne loliiformis,** *F.v.M.*, (Syn. *Festuca*, or *Leptochloa loliiformis*, F.v.M.), B.Fl., vii., 618.

A good pasture grass, of slender habit. It is low-growing, plentiful on light, loamy, or sandy soils, and a good sheep grass. Perennial; seeds in October.

All the colonies except Tasmania and Western Australia.

55. **Distichlis maritima,** *Rafinesque*, (Syn. *D. thalassica*, E. Desv.; *Brizopyrum spicatum*, Hook. et Arn.; *Uniola distichophylla*, Labill.; *Poa distichophllya*, R.Br.; *P. paradoxa*,

Roem. et Schult.; *P. Michauxi*, Kunth; *P. thalassica*, Kunth.; *Festuca distichophylla*, Hook. f.); B.Fl., vii., 637.

This dwarf creeping grass is of great value for binding soil, forming rough lawns, useful for edging garden plots in arid places, and covering coast sand.

All the colonies except Western Australia and Queensland.

56. **Echinopogon ovatus,** *Beauv.*, (Syn. *E. Sieberi*, Steud.; *Agrostis ovata*, Forst.; *Cinna ovata*, Kunth; *Hystericina alopecurioides*, Steud.); B.Fl., vii., 599.

"Rough-bearded Grass."

An erect, glabrous grass, found plentifully throughout the winter months along the banks of rivers and creeks. Mr. Buchanan (*Indigenous Grasses of New Zealand*) speaks of it as a harsh, scabrid grass. He states that it is eaten by sheep and cattle, but is of little value on account of its harsh, non-succulent foliage and straggling habit.

All the colonies.

57. **Ectrosia leporina,** *R.Br.*, B.Fl., vii., 633.

Perennial; seeds in October and November. A good pasture grass.

New South Wales to Northern Australia.

58. **Ectrosia leporina,** var. **micrantha,** *R.Br.*, B.Fl., vii., 634.

Perennial; seeds in October and November. A somewhat uncommon grass, growing on sandy soil, and not of much value on account of its rarity.

North Queensland.

59. **Eleusine ægyptiaca,** *Pers.*, (Syn. *E. cruciata*, Lam.; *E. radulans*, R.Br.; *Cynosurus ægyptius*, Linn.; *Dactyloctenium ægyptiacum*, Willd.), B.Fl., vii., 615.

"Egyptian Finger Grass."

This is a fine dwarf succulent open pasture grass, highly spoken of by sheep owners. It is a very nutritious annual, of prostrate habit, growing plentifully on rich soils; seeds in October.

"It is deserving of extensive cultivation." (Bailey).

All the colonies except Tasmania.

60. **Eleusine indica,** *Gærtn.*, (Syn. *E. marginata*, Lindl.; *Cynosurus indicus*, Linn.; *Panicum compressum*, Forst.); B.Fl., vii., 615.

In the southern districts this is a strong succulent pasture grass in summer; but further north it affords good pasture throughout the season, and may be recognised by its deep green colour, strong stalks, and star-like panicle, the spikelets of which are flat and broad. This plant is not endemic in Australia.

New South Wales and Queensland.

61. **Elionurus citreus,** *Munro*, (Syn. *Andropogon citreus*, R.Br.); B.Fl., vii., 510.

A leafy grass, with slender stems, bearing spikes of a strong citron scent.

Northern Queensland.

62. **Eragrostis Brownii,** Nees, (Syn. *Poa Brownii*, Kunth.; *P. polymorpha*, R.Br.; *Megastachya polymorpha*, Beauv.); B.Fl., vii., 646.

There are several varieties of this fine pasture grass, common on both rich and poor soils, producing an abundance of foliage; it bears hard feeding, and is one of the best grasses to stand both summer and winter. In fact it keeps beautifully green in the driest Australian summer, even on poor soil.

All the colonies except Tasmania.

63. **Eragrostis Brownii,** *Nees*, var. **interrupta,** (Syn. *E. interrupta*, Steud.; *Poa interrupta*, R.Br.); B.Fl., vii., 647.

A stronger grower than the normal species, but its qualities are much the same.

Queensland and New South Wales.

64. **Eragrostis chætophylla,** *Steud.*, (Syn. *E. setifolia,* Nees ; *Poa diandra,* F.v.M.) ; B.Fl., vii, 648. Noted in Muell. Cens., p. 135, as *E. setifolia.*

A wiry, but excellent fodder grass, perennial, and growing on stiff loamy soil. It seeds in November and December.

All the colonies except Tasmania and Victoria.

65. **Eragrostis eriopoda,** *Benth.*, B.Fl., vii., 648.

Though of rather a wiry nature, this grass is eagerly eaten by stock, and has remarkable drought-resisting powers. It grows on clayey soil, and stock are very fond of it ; it is perennial, and seeds in November and December, as do all the species of this grass.

South Australia, New South Wales, and Northern Australia.

66. **Eragrostis falcata,** *Gaud.*, (Syn. *Poa falcata,* Gaud.); B.Fl., vii., 649.

Peculiar to the back country ; only grows on sandy soil.

All the colonies except Tasmania.

67. **Eragrostis laniflora,** *Benth.*, B.Fl., vii., 648.

Found on clayey soil only; one of the grasses of the remote interior.

South Australia, New South Wales, and Queensland.

68. **Eragrostis lacunaria,** *F.v.M.*, B.Fl., vii., 649.

A fine, but rather wiry grass, on sandy soil ; it is perennial, and is an excellent pasture grass, according to some, while others state that it is of little value for feed.

All the colonies except Tasmania and Western Australia.

69. **Eragrostis leptostachya,** *Steud.*, (Syn. *Poa leptostachya,* R.Br., B.Fl., vii., 645.

A slender growing grass, yielding a fair amount of fodder.

New South Wales and Queensland.

70. **Eragrostis pilosa**, *Beauv.*, or *Palisot* (?) (Syn. *E. parviflora*, Trin.; *E pellucida*, Steud.; *Poa pilosa*, Linn.; *P. verticillata*, Cav.; *P. parviflora*, R.Br.; *P. pellucida*, R.Br.); B.Fl., vii., 645.

A very abundant, erect, tufted annual grass, affording good feed to stock throughout the season. It is a delicate species, and seeds in abundance.

South and Western Australia, Victoria, New South Wales, and Queensland.

71 **Eragrostis tenella**, *Beauv.*, (Syn. *Poa tenella*, Linn.), B.Fl., vii., 643.

An erect, tufted annual, and a fine productive grass for a sheep run.

All the colonies except Tasmania.

72. **Eriachne obtusa**, *R.Br.*, B.Fl., vii., 632.

A variable grass, making a quantity of feed. It is peculiar to the back country, where it grows on sandy soil, and, although of a somewhat wiry nature, is much relished by stock. It is not plentiful; it is perennial, and seeds in October and November.

New South Wales, Queensland, South and Western Australia.

73. **Eriachne squarrosa**, *R.Br.*, (Syn. *Aira squarrosa*, Spreng.); B.Fl., vii., 628.

An erect-growing species, and a good pasture grass.

Northern Queensland.

74. **Eriochloa annulata**, *Kunth*, (Syn. *Paspalum annulatum*, Flügge; *Helopus annulatus*, Nees); B.Fl., vii., 463.

A quick-growing, succulent grass, highly relished by stock. It is perennial, and endures moderate cold, and in South Queensland affords fodder all the year round. It resists drought. (Bailey.) It stands well during the winter months, and makes early spring growth. It is annual, and seeds in December.

Queensland, New South Wales and South Australia.

75. **Eriochloa punctata,** *Hamilt.*, (Syn. *Milium punctatum*, Linn.; *Paspalum punctatum*, Flügge); B.Fl., vii., 462.

This is an excellent grass, both for summer and winter; it is rapid-growing, sweet, and succulent, and is greatly relished by stock. It is perennial, and grows on stiff, clayey soil. Seeds in November and December.

Queensland, Victoria, and New South Wales.

76. **Festuca ovina,** *Linn.*, (Syn. *F. duriuscula*, Linn.); B.Fl., vii., 664. *F. duriuscula* in Muell. Cens., p. 134.

"Sheep's Fescue."

A perennial grass, thriving on widely different soils, even on moory and sandy ground. It yields a good crop, resists drought, and is also well adapted for lawns and the swards of parks. It is not endemic in Australia.

All the colonies except Queensland and Western Australia.

77. **Glyceria dives,** *F.v.M.*, (Syn. *Festuca dives*, F.v.M.; *Poa dives*, F.v.M.); B.Fl., vii., 659. *Poa dives* in Muell. Cens., p. 134.

One of the most magnificent of all sylvan grasses, not rarely twelve feet, and exceptionally seventeen feet high; root perennial, or, perhaps, of two or three years' duration. This grass deserves to be cultivated in any forest tracts, as it prospers in shade; along rivulets in deep soil it assumes its grandest forms. It requires a cool climate. The large panicle affords nutritious forage.

Victoria, from West Gippsland to Dandenong, and the sources of the Yarra and Goulburn.

78. **Glyceria fluitans,** *R.Br.*, (Syn. *Festuca fluitans*, Linn.); B.Fl., vii., 657. *Poa fluitans*, Scopoli, in Muell. Cens., p. 134.

"Manna Grass."

Perennial; excellent for stagnant water and slow-flowing streams. The foliage is tender. The seeds are sweet and palatable, and are in many countries used for porridge.

All the colonies except Queensland.

79. **Glyceria Fordeana,** *F.v.M.*, (Syn. *Poa Fordeana*, F.v.M.); B.Fl., vii., 637. *Poa Fordeana* in Muell; Cens., p. 134.

Perennial; seeds in September and October. An excellent fodder grass, rich and succulent, growing plentifully in moist situations.

South Australia, Tasmania, and New South Wales.

80. **Glyceria ramigera,** *F.v.M.*, (Syn. *Poa ramigera*, F.v.M.); B.Fl., vii., 659. *Poa ramigera* in Muell. Cens., p. 134.

"Cane Grass," "Bamboo Grass."

A tall cane-like species, growing plentifully in large detached tussocks in "clay pans," or as they are locally termed, "cane swamps." It is largely used for thatching purposes, for which it is admirably adapted. Roofs twenty years old made of this grass are standing and are waterproof still. Stock are exceedingly fond of the seed-heads and young succulent shoots. It seeds as a rule in November and December, and is perennial.

South Australia, Victoria, and New South Wales.

81. **Hemarthria compressa,** *R.Br.*, (Syn. *H. uncinata*, R.Br.); B.Fl., vii., 510.

A strong, hard grass, with creeping roots, found on wet sour soils, and useful for covering land of that description.

Throughout the colonies.

82. **Heteropogon contortus,** *Rœm. et Schult.*, (Syn. *H. hirtus*, Pers.; *Andropogon contortus*, Linn.; *A. striatus*, R.Br.); B.Fl., vii., 517. *Andropogon contortus* in Muell. Cens., p. 132.

"Spear Grass."

A splendid grass for a cattle run, as it produces a great amount of feed, but is dreaded by the sheep-owner on account of its spear-like seeds.

Western Australia; New South Wales to Northern Australia.

83. **Heteropogon insignis,** *Thw.*, (Syn. *Andropogon triticeus*, R.Br.); B.Fl., vii., 517. Noted in Muell. Cens., p. 132, as *Andropogon triticeus*.

A robust perennial, and one of the tallest of our tropical grasses. The flower-stalks attain a height of eight to twelve feet, and are hard and cane-like, but a quantity of leafy feed is produced at their base. Its strong and wiry roots penetrate from two to three feet into the ground. Cattle and horses are extremely fond of it. This plant is not endemic in Australia.

Queensland and Northern Australia.

84. **Hierochloa alpina,** *Rœm. et Schult.*, (Syn. *H. borealis*, Schrœder; *H. odoratus*, Linn.; *H. Fraseri*, Hook.); B.Fl., vii., 559, where it is given var. *Fraseri* of *H. redolens. H. redolens* in Muell. Cens., p. 132.

"Holy Grass."

This is a very sweet scented grass. Much historical interest is attached to this species in some parts of Europe, from a long-prevailing custom of strewing it before churches on certain festivals. In Sweden it is hung over beds, in the belief that it induces sleep; and in Iceland it is used to scent the clothes and apartments of the inhabitants. According to Cuthbert W. Johnson, its nutritive qualities are greater than in most of the early spring grasses; but from the paucity of its foliage it cannot be recommended in agriculture. From this opinion it may be concluded that this species will be valuable in the sub-alpine pastures of New Zealand as an early and nutritious food, and, from its small growth, be well adapted for sheep. (Buchanan, *Indigenous Grasses of New Zealand)*.

In Tasmania, Victoria, and New South Wales.

85. **Hierochloa redolens,** *R.Br.*, (Syn. *H. antarctica*, R.Br.; *Holcus redolens*, Forst.; *Melica magellanica*, Desv.; *Dis-arrhenum antarcticum*, Labill.; *Torresia redolens*, Brown); B.Fl., vii., 558. (*Hierocloe* in Muell. Cens.)

"Scented Grass."

A tall, perennial, nutritious grass, with the odour of *Coumarin*. It is worthy of dissemination on moist pasture land. These grasses are particularly valuable for their fragrance as constituents

of hay. *Hierochloas* are particularly suitable for cold, wet, moory grounds. This plant is not endemic in Australia.

Tasmania, Victoria, and New South Wales.

86. **Imperata arundinacea,** *Cyr.*, B.Fl., vii., 536.

"Blady Grass."

This is one of the grasses most frequently met with on rich alluvial land, is one of the most common grasses of Northern Australia, and produces, after being burnt, a large quantity of succulent feed, relished by stock. When kept eaten down in the spring, and not allowed to become rank, it affords good feed for a considerable length of time.

All over the colonies.

87. **Isachne australis,** *R.Br.*, (Syn. *Panicum atrovirens*, Trin.; *P. antipodum*, Spreng.); B.Fl., vii., 625. Recorded as *Panicum atrovirens* in Muell. Cens., p. 130.

A perennial grass, not large, but of tender, nutritive blade, particularly fitted for moist valleys and woodlands. It is greedily eaten by all kinds of stock; it also grows in India, China, etc. Mr. Buchanan says that little is known of this grass except in the Auckland district, New Zealand, where, according to Kirk, it is abundant in swampy places. He calls it a valuable grass.

Eastern Australia.

88. **Ischæmum australe,** *R.Br.*, (Syn. *Andropogon cryptatherus*, Steud.), B.Fl., vii., 519.

This species is found near rivers and swamps; it has a creeping underground root, from which it springs up quickly, yielding a good deal of fodder.

New South Wales and Northern Australia.

89. **Ischæmum laxum,** *R.Br.*, (Syn. *Andropogon nervosus*, Rottb.; *Hologamium nervosum*, Nees); B.Fl., vii., 522.

"Rat-tail Grass."

An upright, slender growing grass; found throughout the colony, rather coarse, but yielding a fair amount of feed, which is readily eaten by cattle.

Queensland and Northern Australia.

90. **Ischæmum pectinatum,** *Trin.*, (Syn. *Andropogon falcatus*, Steud.); B.Fl., vii., 521.

This is a fine growing grass, forming dense tufts of herbage.

New South Wales and Queensland.

91. **Lappago racemosa,** *Willd.*, (Syn. *Tragus racemosus*, Desf.); B.Fl., vii., 506. Noted in Muell. Cens., p. 131, as *Tragus racemosus*.

An annual, found on ridges, and a good grass for winter and early spring. It is very similar in habit to *Panicum helopus*; stock are very fond of it; it seeds in October and November.

All the colonies except Western Australia and Tasmania.

92. **Leersia hexandra,** *Swartz.*, (Syn. *L. australis*, R.Br.; *L. mexicana*, Kunth; *Asprella australis*, Rœm. et Schult.); B.Fl., vii., 549.

"Rice Grass."

A rough-leaved species, common along the watercourses of Queensland. Stock are remarkably fond of it.

New South Wales and Queensland.

93. **Leptochloa chinensis,** *Nees*, (Syn. *L. tenerrima*, Rœm. et Schult; *Poa decipiens*, R.Br.; *P. chinensis*, Kœn; *Eragrostis decipiens*, Steud.; *Eleusine chinensis*, F.v.M.); B.Fl., vii., 617. Noted in Muell. Cens., p. 134, as *Eleusine chinensis*.

An excellent pasture grass, much relished by stock; it has tender panicles, and grows from two to three feet high. It is not endemic in Australia.

New South Wales and Queensland.

94. **Leptochloa subdigitata,** *Trin.*, (Syn. *Poa digitata*, R.Br.; *Eleusine digitata*, Spreng.; *E. polystachya*, F.v.M.); B.Fl., vii., 617. Noted in Muell. Cens., p. 134, as *Eleusine digitata*.

Valuable for fixing wet river banks and slopes; it forms large patches; cattle and horses relish it.

All the colonies except Victoria and Tasmania.

95. **Microlœna stipoides,** *R.Br.*, (Syn. *M. Gunnii*, Hook. f.; *Ehrharta stipoides*, Labill.); B.Fl., vii., 552. Noted in Muell. Cens., p. 132, as *Ehrarta stipoides*.

"Weeping Grass," "Meadow Rice Grass."

A perennial grass, which keeps beautifully green all through the year. For this reason its growth for pasturage should be encouraged, particularly as it will live on poor soil, provided it be damp. It is considered nearly as valuable as Kangaroo grass, and in the cool season more so. Mr. Bacchus finds it to bear overstocking better than any other native grass, and to maintain a close turf. It is valued in New Zealand. High testimony of the value of this grass is also given by Ranken, after experiments extending over many years. It, however, does not always freely seed. An analysis made in spring gave the following results:—

Albumen	1·66
Gluten	9·13
Starch	1·64
Gum	3·25
Sugar	5·05

(F.v.M. and L. Rummel).

Throughout the colonies.

96. **Neurachne Mitchelliana,** *Nees*, B.Fl., vii., 508.

"Mulga Grass."

With its companion, *N. Munroi* (F.v.M), eligible as a perennial fodder grass for naturalisation in sandy or dry sterile land. It endures drought, but requires heavy rain to start anew. (R. S. Moore.)

According to Mr. Bailey it produces good pasture feed, and is relished by stock of all kinds. It is a short, thickly-growing species, peculiar to back country; seeds in September and October.

South Australia, Victoria, New South Wales, and Queensland.

97. **Neurachne Munroi,** *F.v.M.*, (Syn. *Panicum Munroi*, F.v.M.); B.Fl., vii., 508.

A very rare grass, peculiar to the back country, and only found amongst Mulga scrubs (*Acacia aneura* and allied species).

Interior of South Australia, Victoria, and New South Wales.

98. **Oplismenus compositus,** *Beauv.*, (Syn. *Panicum compositum*, Linn.; *Orthopogon compositus*, R.Br.); B.Fl., vii., 491.

This is a useful grass for covering ground under the shade of trees. It is not of much use for fodder, as stock seldom touch it.

Victoria, New South Wales, and Queensland.

99. **Oplismenus setarius,** var., *Rœm. et Schult.*, (Syn. *O. æmulus*, Kunth; *Panicum imbecille*, Trin.; *Orthopogon æmulus*, R.Br.; *Hekaterosachne elatior*, Steud.); B.Fl., vii., 492. Under *Setaria glauca* in Muell. Cens., p. 130.

"Slender Panic Grass."

A sparse-foliaged grass, not adapted for pasture, its usual habitation being under the shelter of bush. It may be termed an unsocial grass, as it is most commonly found growing in isolated patches, and it probably could not exist under a struggle for place with grasses of more robust habit on open land. Cattle eat this grass readily, but their relish for it must be greatly lessened by the large amount of foreign matter, such as dead leaves, with which it is usually associated; it may, therefore, be classed with some other bush grasses as an auxiliary to supplement neighbouring pastures during dry seasons. (Buchanan, *Indigenous Grasses of New Zealand.*)

South Australia and Victoria, to Northern Australia.

100. **Panicum bicolor,** *R.Br.*, B.Fl., vii., 487.

A good, useful perennial pasture grass, growing thickly on sandhills. It seeds in November and December.

New South Wales and Queensland.

101. **Panicum brevifolium,** *Flüg.*, (Syn. *P. tenuiflorum,* R.Br.); B.Fl., vii., 461.

This grass has a running stem, and forms a good bottom as a pasture grass. (Bailey.) It is not endemic in Australia.

New South Wales, Queensland, and Northern Australia.

102. **Panicum cœnicolum,** *F.v.M.*, B.Fl., vii., 467.

Valuable as a lasting grass for moist meadows.

All the colonies except Queensland and Tasmania.

103. **Panicum colonum,** *Linn.*, (Syn. *Oplismenus colonum,* Kunth); B.Fl., vii., 478.

"Shama Millet" of India; called also, in parts of India, "Wild Rice" or "Jungle Rice."

Has erect stems from two to eight feet high, and very succulent. The panicles are used by the aboriginals as an article of food. The seeds are pounded between stones, mixed with water, and formed into a kind of bread. It is not endemic in Australia.

Composition of Shama (husked)—

	In 100 parts.		In 1 lb.
Water ...	12.0	...	1 oz. 403 grs.
Albuminoids	9.6	...	1 ,, 234 ,,
Starch ...	74.3	...	11 ,, 388 ,,
Oil ...	.6	...	42 ,,
Fibre ...	1.5	...	105 ,,
Ash ...	2.0	...	140 ,,

Food-grains of India. (Church).

North Queensland.

104. **Panicum crus-galli,** *Linn.*, (Syn. *Oplismenus crus-galli,* Kunth; *Echinochloa crus-galli,* Beauv.); B.Fl., vii., 479.

"The Barnyard, or Cockspur Grass."

A strong-growing grass, which affords a large amount of feed to cattle in seasons of scarcity, and is much improved by cultivation. It is from one to eight feet high, and is found in swamps. It is a rich but annual grass of ready, spontaneous dispersion, particularly along sandy river banks, also around stagnant water. It will succeed also on somewhat saline soil, particularly on brackish watercourses, also in moor land. It is regarded by R. Brown as indigenous in Eastern and Northern Australia, and Bentham, while retaining the species, observes that this common weed of most tropical and temperate countries has probably been introduced in some of the Australian localities. In an English work it has been described as "a strong, coarse grass, found in moist, arable land in Great Britain, but of no agricultural use." (Parnell). But according to Bailey, speaking of its adaptability for Queensland, "this fine, succulent grass is well adapted for sowing on damp land, for cutting like sorghum for fodder. If cut early it will make a second growth. Horses are particularly fond of it."

All the colonies except Tasmania.

105. **Panicum decompositum,** *R.Br.*, (Syn. *P. proliferum*, F.v.M.; *P. amabile*, Balansa; *P. lævinode*, Lindl.); B.Fl., vii., 489.

"Australian Millet," "Umbrella Grass," "Tindil" of the aboriginals of the Cloncurry River, North Queensland.

One of the most valuable of the Darling Downs (Queensland) grasses. Under cultivation it has yielded in one season over three tons of hay per acre. It is a semi-aquatic species, tall, coarse, and succulent, producing abundance of feed, and greatly relished by stock. It seeds in December and January. It is short-lived, but is one of the most spacious of Australian nutritious species. The aborigines convert the small millet-like grains into cakes.

Alluding to this grass, Sir Thomas Mitchell (*Three Expeditions*) pp. 237 and 290, says :—"In the neighbourhood of our camp the grass had been pulled to a very great extent, and piled in hay-ricks, so that the aspect of the desert was softened into the agreeable semblance of a hay-field. The grass had evidently been thus laid up by the natives, but for what purpose we could not

imagine. At first I thought the heaps were only the remains of encampments, as the aborigines sometimes sleep on a little dry grass, but when we found the ricks, or hay-cocks, extending for miles, we were quite at a loss to understand why they had been made. All the grass was of one kind, and not a spike of it was left in the soil, over the whole of the ground. . . . We were still at a loss to know for what purpose the heaps of one particular kind of grass had been pulled, and so laid up hereabouts. Whether it was accumulated by the natives to allure birds, or by rats, as their holes were seen beneath, we were puzzled to determine. The grass was beautifully green beneath the heaps, and full of seeds, and our cattle were very fond of this hay." (See "Foods.")

This plant is not endemic in Australia.

All the colonies except Tasmania.

106. **Panicum distachyum,** *Linn.*, (Syn. *P. subquadriparum*, Trin.); B.Fl., vii., 478.

The stems of this grass creep and root at the joints; it is an immense yielder, and is grown for hay in the northern districts.

This is one of several indigenous grasses tested at Gracemere, near Rockhampton, and considered best for the purpose of hay-making. (Bailey). It is not endemic in Australia.

Northern Australia, Queensland, New South Wales, and South Australia.

107. **Panicum divaricatissimum,** *R.Br.*, B.Fl., vii., 467.

"Spider Grass."

Found more abundantly in the warmer inland regions. A good perennial and drought-resisting species. It is an excellent fodder grass, and grows profusely on light loamy and sandy soil. It seeds in November and December.

All Australia, except Tasmania and Western Australia.

108. **Panicum effusum,** *R.Br.*, B.Fl., vii., 488.

An erect-growing grass, making a good pasture; it is a free seeder, and a favorite amongst stockowners. It is a succulent

summer grass growing on stiff clayey soil; it is much relished by stock, but is of short duration, soon withering off It seeds from October to December.

All the colonies except Tasmania.

109. **Panicum flavidum,** *Retz.*, (Syn. *P. brizoides*, Jacq.); B.Fl., vii., 474

"Vandyke Grass" (of Bailey).

This is a fine succulent grass; when growing on alluvial flats the panicles are often prostrate from the weight of seed; a good winter species. Amongst the many species of grasses found in Western New South Wales there is none that stock are more fond of than this. It is met with both on the plains and in the back country, more particularly in the latter, and is only found on rich sandy or loamy soil, and amongst timber, and as a rule beneath the shelter of some spreading tree or large bush. It is perennial, and seeds in October and November. It is not endemic in Australia.

The warmer parts of New South Wales, also Queensland and Northern Australia.

110. **Panicum foliosum,** *R.Br.*, B.Fl, vii., 481.

A grass with broad, hairy leaves, usually found on ground that has been cultivated. It yields a fair amount of feed; it is one of the best grasses for river banks.

Northern New South Wales and Queensland.

111. **Panicum gracile,** *R.Br.*, (Syn. *P. jubiflorum*, Trin.; *P. distans*, Trin.); B.Fl., vii., 475.

A highly nutritious grass, growing on light rich soil. All descriptions of stock are fond of it. It is a summer species, and is perennial; it seeds in November and December.

All the colonies except Tasmania.

112. **Panicum helopus,** *Trin.*, (Syn. *Urochloa pubescens*, Beauv.; *U. panicoides*, Beauv.); B.Fl., vii., 476.

An exceedingly succulent and nutritious annual grass, growing plentifully on sand-hills and loose, sandy soil. It is of

prostrate habit, seeds in October and November, and all descriptions of stock are fond of it.

South Australia; New South Wales to Northern Australia.

113. **Panicum indicum,** *Linn.*, B.Fl., vii., 480.

A grass usually found in wet soils and swamps; produces a fair amount of feed during summer. It is not endemic in Australia.

North and South Queensland, and New South Wales.

114. **Panicum leucophæum,** *H.B. et K.*, (Syn. *P. villosum*, R.Br.; *P. Brownii*, Rœm et Schult.; *P. glareæ*, F.v.M.; *P. laniflorum*, Nees.); B.Fl., vii., 472.

A very good pasture grass, producing an abundance of feed during winter. It is a tall, perennial summer species, growing in detached tussocks on sand-hills. Stock of all kinds are extremely fond of it. The seeds ripen freely in November and December, and are of a beautifully soft and velvety nature. It is not endemic in Australia.

All the colonies except Tasmania and Western Australia.

115. **Panicum macractinum,** *Benth.*, B.Fl., vii., 468.

"Roly-poly Grass."

This species produces immense dry and spreading panicles; it is perennial, and seeds in November and December. It is a somewhat straggling species, growing in detached tufts, on sand-hills and sandy soil, and much relished by stock.

New South Wales and Queensland.

116. **Panicum marginatum,** *R.Br.*, B.Fl., vii., 485.

A rigid, coarse grass, found on hard, strong ground; of little value for fodder.

Southern Queensland, New South Wales, and Victoria.

117. **Panicum melananthum,** *F.v.M.*, B.Fl., vii., 488.

An annual, with a creeping stem; yields a fair amount of feed during the summer; this species is easily distinguished by its

large panicle of dark-coloured seeds. It seeds in October and November, and is rather a rare species, growing on light loamy soil.

Southern Queensland, New South Wales and Victoria.

118. **Panicum Mitchelli,** *Benth.*, B.Fl., vii., 489.

An erect-growing perennial grass, nearly allied to *P. effusum*, but of stronger growth, a quick grower, yielding a great amount of feed, highly relished by stock. It seeds in October and November, and is a highly succulent and nutritious grass, growing in detached tussocks on rich loamy soil on the plains. The leaves of this species are unusually broad; it soon withers in dry weather.

All the colonies except Tasmania and Western Australia.

119. **Panicum myurus,** *Lamarck.*, (Syn. *P. interruptum*, Willd.; *Hymenachne myurus*, Beauv.); B.Fl., vii., 480.

A perennial aquatic grass, with broad-bladed foliage, fit for ditches and swamps. It is regarded as very palatable and nutritious to stock by Mr. Bailey. It is a common tropical grass.

North-eastern Australia.

120. **Panicum parviflorum,** *R.Br.*, B.Fl., vii., 470.

A fine pasture grass, generally met with on ridges. There are two varieties—one with fine spreading panicles, and the other having only one or two very long, erect spikelets in its panicle. Both of them are excellent grasses, and worthy of cultivation. The species is erect-growing, very productive during summer, stands drought well, and produces plenty of seed. According to Mr. Bailey it is amongst the nutritious grasses of Australia.

New South Wales and Queensland.

121. **Panicum prolutum,** *F.v.M.*, B.Fl., vii., 490.

An erect, rigid-growing species, producing a quantity of feed during the summer months, and seeds at various times during the year; it is perennial. It is a very common grass on black soil or ground subject to inundation, and valuable from its drought-resisting nature. When other grasses are plentiful it is not much

eaten, but when the more delicate kinds are withered, it is readily eaten, as it retains its greenness long after the others have become dry. In former years, the seeds of this grass were gathered in large quantities by the natives as an article of food, and being ground between two stones, was converted into a kind of meal.

All the colonies except Tasmania and Western Australia.

122. **Panicum prostratum,** *Lamarck.*, B.Fl., vii., 476.

Perhaps also indigenous to tropical America. It is perennial, and good for pastures.

Northern Australia.

123. **Panicum pygmæum,** *R.Br.*, B.Fl., vii., 484.

A small species, creeping and rooting at the nodes; will grow well under a dense shade. It forms a soft, thick, carpet-like verdure. (Bailey.)

New South Wales and Queensland.

124. **Panicum repens,** *Linn.*, (Syn. *P. arenarium*, Brot.; *P. airoides*, R.Br.); B.Fl., vii., 484.

The stems spring from a creeping and rooting base; it is too small a grass to be of value for feed, but will grow well under a dense shade, yet some style it a good fodder grass. It is perennial, and well suited for naturalization on moist soil, river banks or swamps. It is not endemic in Australia.

All the colonies except Tasmania and Western Australia.

125. **Panicum sanguinale,** *Linn.*, (Syn. *Digitaria sanguinalis*, Scop.; *Syntherisma vulgare*, Schrad.); B.Fl., vii., 469.

"Hairy" or "Cock's-foot Finger-grass." "Summer Grass."

A creeping, quick-growing grass; a great pest to farmers. It readily disseminates itself on barren ground, and is likely to add to the value of desert pastures, although it is annual. Stock relish this grass.

"It is of no agricultural use, but rather a troublesome weed, especially in those countries in which it is a native." (Parnell.)

It produces much seed, of which birds are very fond, and requires to be protected by nets, or otherwise, during the time of ripening. The smaller birds pick out the ripe seed, even when only a small quantity is formed among the blossoms. The common method of collecting and preparing it in Germany is as follows:—At sunrise the grass is gathered or beaten into a hair-sieve from the dewy grass, spread on a sheet, and dried for a fortnight in the sun; it is then gently beaten with a wooden pestle in a wooden trough or mortar, with straw laid between the seeds and the pestle, till the chaff comes off; they are then winnowed. After this they are again put into the trough or mortar in rows, with dried marigold flowers, apple, and hazel-leaves, and pounded till they appear bright; they are then winnowed again, and being made perfectly clean by this last process, are fit for use. The marigold leaves are added to give the seed a finer colour. A bushel of seed with the chaff yields only about two quarts of clean seed. When boiled with milk and wine it forms an extremely palatable food, and is in general made use of whole, in the manner of sago, to which it is in most instances preferred. (*Hortus Gramineus Woburnensis*).

All the colonies except South Australia and Tasmania.

126. **Panicum semialatum,** *R.Br.*, (Syn. *Urochloa semialata*, Kunth; *Coridochloa semialata*, Nees.); B.Fl., vii., 472.

This species produces a quantity of feed from thick nodes at the base; it will stand drought well, and stock are fond of it. It is a tall, superior pasture grass, of easy dispersion in warm, humid localities. It is not endemic in Australia.

New South Wales and Queensland.

127. **Panicum trachyrachis,** *Benth.*, B.Fl., vii., 490.

"Oo-kin" of the aborigines of the Mitchell River (North Queensland).

A valuable open pasture grass, of quick growth, producing a great amount of feed during summer; is also a free seeder. The seeds are sometimes used as food by the natives.

New South Wales, Queensland, and Northern Australia.

128. **Pappophorum nigricans,** *R.Br.*, (Syn. *P. commune*, F.v.M.; *P. pallidum*, R.Br.; *P. purpurascens*, R. Br.; *P. gracile*, R.Br.; *P. cœrulescens*, Gaud.; *P. flavescens*, Lindl.; *P. virens*, Lindl.); B.Fl., vii., 601. *P. commune* in Muell. Cens., p. 133.

Widely dispersed over the continent of Australia, also in some parts of Asia and Africa. Perennial; regarded as a very fattening pasture grass, although the flower spikes are of a wiry nature. It is useful for arid localities. It is a somewhat coarse species, growing on sandhills plentifully; but it is not much eaten by stock when other grass is available. Seeds in October and November.

All the colonies except Tasmania.

129. **Paspalum brevifolium,** *Flüg.*, (Syn. *Panicum tenuiflorum*, R.Br.); B.Fl., vii., 461.

Stems erect and slender from a creeping root; will stand on high land; produces a fair amount of feed and plenty of seed.

Northern Australia, Queensland, and New South Wales.

130. **Paspalum distichum,** *Linn.*, (Syn. *P. littorale*, R.Br.); B.Fl., vii., 460.

"Sea-side Millet," "Water Couch," "Silt Grass."

A creeping, rapid-growing, succulent grass, found growing in swampy land, sometimes in water, producing in the summer months a quantity of feed; is a poor grass for making hay, as it turns black in drying. Horses and cattle eat it readily. It supplies valuable food for stock in localities where species of value are never abundantly found. It is beautifully green throughout the year, and offers a sufficiently tender blade for feed; is exceptionally adapted to cover silt or bare slopes on banks of ponds or rivers, where it grows grandly; moderate submersion does not destroy it, but frost injures it; it thrives well also on salt marshes.

Queensland, New South Wales, and Western Australia.

131. **Paspalum scrobiculatum,** *Linn.*, (Syn. *P. orbiculare*, Forst.; *P. polystachyum*, R.Br.; *P. pubescens*, R.Br.; *P. metabolon* Steud.); B.Fl., vii., 460.

"Ditch Millet." The "Koda Millet" of India. "Hureek."

An erect, quick-growing, pasture grass, which furnishes a good ingredient for hay. The stem sometimes attains a height of eight feet. It stands winter well, and will bear close feeding. The flower panicle of this species is terribly subject to ergot in the autumn months. Its value for pasture by itself is probably insignificant. A variety of this grass, called "Hureek" in India (which is, perhaps, the "Ghohona Grass," a reputed Indian poisonous species), is said to render the milk of cows that graze upon it narcotic and drastic. (Lindley, quoted in *Handbook of New Zealand Grasses.*) Is this because of its liability to ergotism? This grass is much used by the Fijians for strewing the floors of their houses and public buildings. A good variety of this grass ("Koda Millet") is used in India as a food-grain.

Composition of "Koda Millet" (husked).

	In 100 parts.	In 1 lb. oz.	grs.
Water	... 11.7 ...	1	382
Albuminoids ...	... 7.0 ...	1	52
Starch	... 77.2 ...	12	154
Oil	... 2.1 ...	0	147
Fibre	... 0.7 ...	0	49
Ash	... 1.3 ...	0	91

Food Grains of India. (Church.)

New South Wales, Queensland, and Northern Australia.

132. **Pennisetum compressum,** *R.Br.*, (Syn. *Setaria compressa*, Kunth; *Gymnothrix compressa*, Brogn.); B.Fl., vii., 495.

A strong-growing, coarse kind of grass, found on the margins of swamps. Of little value for fodder.

Southern Queensland and New South Wales.

133. **Perotis rara,** *R.Br.*, B.Fl., vii., 509.

This is a slender-growing species, attaining the height of one foot; is a quick grower, and succulent, and stock are stated to be fond of it; but Mr. P. A. O'Shanesy, speaking of the dry summer

of 1881, states that he has observed that goats will not eat it, even in places where there are no other grasses.

All the colonies except Tasmania and Western Australia.

134. **Poa Billardieri,** *Steud.*, (Syn. *P. australis* var. *Billardieri*, Hook; *Arundo poæformis*, Labill.); B.Fl., vii., 651.

A perennial, rigid grass, of some value for pasture.

All the colonies except New South Wales and Queensland.

135. **Poa cæspitosa,** *Forst.*, (Syn. *P. australis*, R.Br.; *P. lævis*, R.Br.; *P. plebeia*, R.Br.; *P. affinis*, R.Br.); B.Fl., vii., 651.

"Weeping Polly-Grass," "Wiry Grass."

A fine grass, with rather a tufty habit of growth, and of very variable form, generally met with upon rich, damp soils, where it produces freely. It is a rich and succulent grass, forming a fine fodder. It seeds in September and October.

All the colonies.

136. **Pollinia fulva,** *Benth.*, (Syn. *Saccharum fulvum*, R.Br.; *Erianthus fulvus*, Kunth); B.Fl., vii., 526. Noted in Muell. Cens., p. 131, as *Erianthus fulvus*.

"Sugar Grass."

The "Sugar Grass" of colonists, so called on account of its sweetness; it is highly productive, and praised by stockowners. Cattle eat it close down, and therefore it is in danger of extermination, but it is readily raised from seed.

All the colonies except Tasmania.

137. **Rottbœllia ophiurioides,** *Benth.*, (Syn. *Andropogon rottbællioides*, Steud.; *Ischæmum rottbællioides*, R.Br.); B.Fl., vii., 514.

A tall, perennial grass, praised by Mr. Walter Hill as a fodder plant. It is hardy in regions free from frost. Its culm rises to the height of eight feet, and it yields a large quantity of fodder, as its culm, seed, and foliage, together with the base of its thick stem, are eagerly eaten by cattle and horses.

Queensland, and Northern Australia.

138. **Setaria glauca,** *Palisot,* (Syn. *Panicum glaucum,* Linn. *Pennisetum glaucum,* R.Br.) ; B.Fl., vii., 492.

An erect-growing, annual grass of quick growth, producing an abundance of succulent herbage, highly relished by stock; is also a free seeder.

All the colonies except Tasmania.

139. **Setaria macrostachya,** *H.B. et K.,* (Syn. *Panicum macrostachyum,* Nees. ; *Pennisetum italicum,* R.Br.); B.Fl., vii., 493.

Found along the banks of creeks, but will also grow on any ground. Produces a great amount of feed, of which cattle are extremely fond.

All the colonies except Tasmania.

140. **Schedonorus Hookerianus,** *Benth.,* (Syn. *Festuca Hookeriana,* F.v.M. ; *Poa Hookeriana,* F.v.M.) ; B.Fl., vii., 656. Noted in Muell. Cens., p. 134, as *Festuca Hookeriana.*

A tall, perennial grass, evidently nutritious ; should be tried for pasture, and perhaps destined to become a meadow grass of colder countries. It does not readily produce seed. It stands mowing and depasturing well, and is much liked by cattle, horses, and sheep.

Tasmania, Victoria, and New South Wales.

141. **Schedonorus littoralis,** *Beauv.,* (Syn. *S. Billardieranus,* Nees ; *Festuca littoralis,* Labill. ; *Arundo triodioides,* Trin.) ; B.Fl., vii., 655. Noted in Muell. Cens., p. 134, as *Festuca littoralis.*

An important grass for binding drift-sand on sea-shores.

All the colonies.

142. **Sorghum fulvum,** *Beauv.,* (Syn. *Holcus fulvus,* R.Br. ; *Andropogon tropicus,* Spreng.) ; B.Fl., vii., 541. *Andropogon tropicus* in Muell. Cens., p. 132.

A strong erect-growing species, succulent when young, and a splendid grass for a cattle run. Not endemic in Australia.

Queensland and Northern Australia.

143. **Sorghum halepense,** *Pers.*, (Syn. *Holcus halepensis*, Linn.; *Andropogon halepense*, Sibth.); B.Fl., vii., 540. Noted in Muell. Cens., p. 132, as *Andropogon halepense.*

A strong, erect-growing species, varying from two to ten feet high, succulent when young, a splendid grass for a cattle run, though not much sought after by sheep. It is a free seeder. The settlers on the banks of the Hawkesbury (New South Wales) look upon it as a recent importation, and seed of it has been distributed under the name of *Panicum spectabile!* (Woolls.)

Coast of Queensland, New South Wales, and Western Australia.

144. **Spinifex hirsutus,** *Labill.*, (Syn. *S. sericeus*, Raoul.; *S. inermis*, Bks. et Sol.; *Ixalum inerme*, Forst.); B.Fl., vii., 503.

"Spring Rolling Grass."

The present grass has no claim whatever as a food plant for stock, and can only be recommended as a sand-binder in fixing drift sands when encroaching on valuable land. For this purpose it deserves more attention than has hitherto been bestowed upon it. It is a plant of comparatively rapid growth, and would give effectual aid in checking the inroads of wind-driven sand, conditionally that the plants be carefully conserved from fire. (Buchanan, *Indigenous Grasses of New Zealand.*) *S. longifolius*, *R.Br.*, (Syn. *S. fragilis*, R.Br.), is another species valuable for the same purpose.

On the coast of all the colonies.

145. **Sporobolus actinocladus,** *F.v.M.*, (Syn. *Vilfa* or *Agrostis actinoclada*, F.v.M.); B.Fl., vii., 623.

Perennial; seeds in October and November. A much esteemed pasture grass of the back country, common on rich loamy soil; stock of all kinds are very fond of it.

South Australia, New South Wales to Northern Australia.

146. **Sporobolus indicus,** *R.Br.*, (Syn. *S. elongatus*, R.Br.; *S. tenacissimus*, Beauv.; *Vilfa elongata*, Beauv.; *V. tenacissima*, Trin.; *V. capensis*, Beauv.); B.Fl., vii., 622.

"Rat-tail Grass." "Chilian Grass." "Jil-crow-a-berry" of the aboriginals of the Cloncurry River, Northern Australia.

A fine, open, pasture grass, found throughout the colonies. Its numerous penetrating roots enable it to resist severe drought. It yields a fair amount of fodder, much relished by stock, but is too coarse for sheep. The seeds form the principal food of many small birds. It has been suggested as a paper-making material. (See "Fibres.")

All the colonies except Tasmania.

147. **Sporobolus Lindleyi,** *Benth.*, (Syn. *S. pallidus*, Lindl.; *S. subtilis*, F.v.M.; *Vilfa Lindleyi*, Steud.); B.Fl., vii., 623.

"Yak-ka Berry" of the aboriginals of the Cloncurry River, North Queensland.

A slender-growing species, making a quantity of growth during winter. It is a perennial grass, growing on rich soil, and is much relished by all kinds of stock. It seeds from October to December.

All the colonies except Tasmania.

148. **Sporobolus pulchellus,** *R.Br.*, (Syn. *Vilfa pulchella*, Trin.); B.Fl., vii., 623.

Similar to *S. actinocladus*, but extremely rare.

New South Wales to Northern Australia.

149. **Sporobolus virginicus,** var. (?) **pallida,** *Kunth*, (Syn. *Agrostis virginica*, Linn.; *Vilfa virginica*, Beauv.; B.Fl., vii., 621.

A fine grass, found near salt marshes, possessing highly fattening qualities. It is also described as a rare grass, only found on loose, white sand, around the margins of lakes, and of no great value. Perennial; seeds in November.

All the colonies except Tasmania.

150. **Stipa spp.**

"Spear Grasses."

These grasses are excellent feeding before the appearance of the inflorescence; afterwards they are known as "Spear Grasses."

Throughout the colonies.

151. **Stipa aristiglumis,** *F.v.M.*, B.Fl., vii., 570.

Graziers consider this perennial grass to be very fattening, and to yield a large quantity of feed. Its celerity of growth is such that when it springs up it will grow at the rate of six inches in a fortnight. Horses, cattle and sheep are extremely fond of it. It ripens seed in little more than two months in favourable seasons. It is a somewhat coarse species, growing plentifully on rich soil in the back country. The seeds of this grass are very injurious to sheep and wool, often in good seasons causing the death of numbers, by first becoming attached to the wool and working through the skin, causing intense fever, and often penetrating into the vitals. Perennial; seeds from September to November.

South Australia, Victoria, New South Wales and Queensland.

152. **Stipa elegantissima,** *Labill.*, B.Fl., vii., 565.

A climbing species. It is usually found growing beneath the shelter of some thick bush, three or four feet high; at the flowering season the seed heads force their way through the bush and cover the whole with a mass of beautiful silver plumes, forming a conspicuous object. It is much relished by stock. It seeds in September and October, and is perennial.

All the colonies except Tasmania.

153. **Stipa micrantha,** *Cav.* (?) **S. verticillata,** *Nees.*, (Syn. *S. ramosissima*, Nees; *Streptachne verticillata*, Trin.; *S. ramosissima*, Trin.; *Urachne ramosissima*, Trin.); B.Fl., vii., 566. Noted in Muell. Cens., p. 132, as *Stipa verticillata*.

"Bamboo Grass."

Though apparently a hard grass, it is highly spoken of as horse-feed, and produces a very large quantity of fodder.

New South Wales and Queensland.

154. **Stipa pubescens,** *R.Br.*, (Syn. *S. rudis*, Spreng.; *S. commutata*, Trin.); B.Fl., vii., 569.

Another climbing grass, found only in the back or timbered country. The seed-heads differ in colour, being a rich brown, nor does it grow so tall as the preceding. Stock are very fond of it. Perennial; seeds in October.

All the colonies.

155. **Stipa scabra,** *Lindl.*, B.Fl., vii., 570.

Although to the casual observer this grass may appear identical with *Deyeuxia Forsteri*, it is really quite distinct, and the difference can be detected by the leaves or blades being much shorter, and in the living plant more thick or fleshy, and as a rule lying flat on the ground, from the centre of which the seed-stalks, rarely more than two in number, spring; whilst they seldom, if ever, attain the height those of *D. Forsteri* does. This grass is peculiar to the back country, and is only found on dry chalky or limy soils, where it grows plentifully. Stock, especially sheep, are excessively fond of it, more so than of the other species, although they are considered good pasture grasses. Perennial; seeds in October and November.

All the colonies except Tasmania.

156. **Stipa setacea,** *R.Br.*, B.Fl., vii., 568.

"Spear Grass."

A rather coarse but very useful grass on account of its drought-resisting qualities, and much relished by stock of all kinds. The seeds are injurious to sheep and to wool; seeds in September and October.

All the colonies.

157. **Stipa teretifolia,** *Steud.*, (Syn. *Dichelachne stipoides*, Hook. f.; *D. setacea*, Nees; *D. rigida*, Steud.; *Agrostis rigida*, A. Rich.); B.Fl., vii., 567.

A densely-tufted or tussock grass, its habitat being near the sea, on banks or rocks. It is perennial, and seeds in January; it is of little value as food for stock, and from its very rigid, non-

succulent habit, is not likely to be improved by cultivation. It is only grazed by horses and cattle during its flowering and seeding season, and the hard wiry nature of its foliage renders it worthless, either in pasture or as fodder. It might, however, be utilised in the manufacture of paper, as it possesses a strong fibrous structure. (Buchanan, *Indigenous Grasses of New Zealand.*)

Western Australia, Tasmania, and Victoria.

158. **Zoysia pungens,** *Willd.*, (Syn. *Rottbœllia uniflora*, A. Cunn.); B.Fl., vii., 506.

A grass of considerable value on littoral swamps and dry flats near the sea. According to Kirk, it is found sometimes forming a compact turf of dry land, and affording a large supply of succulent herbage for horses, cattle and sheep. Its value, however, in such localities, if bulkier grasses would grow there, must be comparatively little, as, from its close-growing habit, it chokes out all other species. It is evidently much relished by stock, and is worthy of introduction in sand-hill districts near the sea, or saline soil inland; it would clothe the wet flats with a valuable sward. It will be easiest propagated by roots, the closely-matted, wiry fibres forming coherent masses of turf, which are easily conveyed in fragments to a distance without injury. (Buchanan, *Indigenous Grasses of New Zealand.*)

Tasmania, Victoria, New South Wales, and Queensland.

FORAGE PLANTS.

B. NON-GRASSES,

INCLUDING

PLANTS INJURIOUS TO STOCK.*

Owing to the severity of the droughts, and, in some districts, the competition of rabbits and other vermin, cattle and sheep in Australia have at times to endeavour to preserve existence by devouring any vegetable matter whatsoever. The plants eaten by stock therefore embrace a very large number of species, but I have confined myself in the following pages to references to the plants usually eaten by them, either because they are abundant, or readily withstand the drought, or because stock are very partial to browsing upon them. The poisonous plants, of course, come under a different category. If I were to record the names of all *suspected* poisonous plants the list would be a very long one. The observations of bushmen as to the poisonous nature of certain plants are not always to be relied on† and the enquiry, even to a scientific man, is attended with much difficulty. In *Plants Injurious to Stock* (Bailey and Gordon), Government Printer, Brisbane, will be found references to a number of suspected plants, but in regard to many, the verdict of "not proven" must be entered.

* Nearly the whole of this section formed the subject of a Paper read by the Author before the Royal Society of N.S.W., 6th June, 1888.

† The allegation is from time to time made in the newspapers that, sometimes through ignorance, and sometimes as a matter of expediency, squatters report that their sheep or cattle have fallen victims to poison-weeds, when in reality they have perished from disease. Whatever the extent of this mis-representation may be, it is an undoubted fact that, during the last few years, many instances of alleged poisoning by weeds having been enquired into on the spot by a competent veterinarian, have been proved to have been caused by disease.

See also "Remarks on some Indigenous Shrubs of South Australia, suitable for culture as Fodder." (S. Dixon.) *Proc. R.S. of S.A.*, vol. viii.

See also a paper by the Rev. Dr. Woolls, "On the Forage Plants Indigenous in New South Wales." (*Proc. Linn. Soc., N.S.W.*, vii., 310.)

Notes on the plants eaten (whether from inclination or necessity) by stock, with good or bad results, the distribution of them, together with any other particulars bearing upon their use as fodder plants, are much required, as the systematic recording of such information is even yet (at least as far as Australia is concerned) in its infancy. It is highly desirable to collect seeds of each useful (or likely to be useful) fodder plant, for experimental cultivation, either with the view to its improvement under such treatment, or with the view to acclimatise it in some other country in which it is not indigenous or already introduced. A careful system of exchange of this kind cannot but result in benefit to the countries concerned.

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1. **Abrus precatorius,** *Linn.*, N.O., Leguminosæ, (Syn. *A. pauciflorus*, Desv.; *A. squamulosus*, E. Mey.); B.Fl., ii., 270.

The pretty little red seeds with black spots are called "Crab's Eyes," and "Jequirity Seeds."

This plant is not sufficiently abundant in Australia to affect stock to an appreciable extent, but it is interesting to observe that the cattle plague commission of India (1870), in their report, mentioned that a large number of the criminal cases of cattle-poisoning are effected through the agency of the seeds of this plant. More extended enquiry showed that this practice was common throughout the greater part of India. (Dymock.)

Queensland and Northern Australia.

2. **Acacia aneura,** *F.v.M.*, N.O., Leguminosæ, and other species, B.Fl., ii., 402.

"Mulga," forming the chief ingredient of the scrub of that name.

The leaves are eaten by stock. In the Technological Museum are samples of wool from sheep fed exclusively on this shrub on a station in Western Queensland. The wool is not of the first quality, as might be expected, but it is good. The following are some particulars of the wool:—

Wool of ewe hoggets (under 10 months' growth), average length of staple 2¾ inches.

Wool of wether hoggets (12 months' growth), average length of staple 4 inches.

Wool of 4-tooth ewes (18 months' growth), length of staple 6¼ inches.

All the colonies except Tasmania.

3. **Acacia doratoxylon,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 403.

"Spear-wood," a "Brigalow," "Currawang," or "Caariwan," "Hickory."

The leaves are eaten by stock.

All the colonies except Tasmania and Western Australia.

4. **Acacia pendula,** *A. Cunn.*, N.O., Leguminosæ, (Syn. *A. leucophylla*, Lindl.); B.Fl., ii., 383.

"Weeping" or true "Myall." Called "Boree" and "Balaar" by the aboriginals of the western districts.

Stock are very fond of the leaves of this tree, especially in seasons of drought, and for this reason, and because they eat down the seedlings, it has almost become exterminated in parts of the colonies.

New South Wales and Queensland.

5. **Acacia salicina,** *Lindl.*, N.O., Leguminosæ, (Syn *A. ligulata*, A. Cunn.); B.Fl., ii., 367.

"Native Willow," and "Broughton Willow," near the Broughton River (Northern S.A.), Called "Cooba" or "Koobah" by the aboriginals of Western New South Wales, and "Motherumba" by those on the Castlereagh River, New South Wales.

The leaves are eaten by stock. This is another tree which is rapidly becoming scarce, owing to the partiality of stock to it.

All the colonies except Tasmania.

6. **Albizzia basaltica,** *Benth.*, N.O., Leguminosæ, (Syn. *Acacia basaltica*, F.v.M.); B.Fl., ii., 422.

"Dead Finish."

Cattle like the foliage of this tree.

Queensland.

7. **Albizzia lophantha,** *Benth.*, N.O., Leguminosæ, (Syn. *Acacia lophantha*, Willd.; *Mimosa distachya*, Vent.; *M. elegans*, Andr.); B.Fl., ii., 421.

Cattle browse on the leaves of this tree. It is, however, of rapid growth.

Western Australia.

8. **Angophora intermedia,** *DC.*, N.O., Myrtaceæ, (Syn. *Metrosideros floribunda*, Smith); B.Fl., iii., 184.

"Narrow-leaved Apple Tree."

Victoria, New South Wales, and Queensland.

9. **Angophora subvelutina,** *F.v.M.*, (Syn. *A. velutina*, F.v.M.); B.Fl., iii., 184.

"Broad-leaved Apple Tree."

New South Wales and Queensland.

The Rev. Dr. Woolls states that these "apple trees" are sometimes cut down to keep cattle alive in dry seasons, as the leaves are relished by them.

10. **Apium leptophyllum,** *F.v.M.*, N.O., Umbelliferæ, (Syn. *Helosciadium leptophyllum*, DC.); B.Fl., iii., 372.

"Wild Parsley."

Occasionally eaten by stock. It is worthy of note that this plant (in common with others of the genus) is sometimes acrid and injurious when grown in damp soils. It is, doubtless, capable of much improvement by careful cultivation. This plant is not endemic in Australia.

Victoria, New South Wales, and Queensland.

11. **Atalaya hemiglauca,** *F.v.M.*, N.O., Sapindaceæ, (Syn. *Thouinia hemiglauca*, F.v.M.); B.Fl., i., 463.

"Cattle Bush." "White-wood."

The leaves of this tree are eaten by stock, the tree being frequently felled for their use during seasons of drought.

South Australia, New South Wales, and Queensland.

12. **Atriplex Billardieri,** *Hook. f.*, N.O., Chenopodiaceæ, (Syn. *A. crystallina,* Hook. f.; *Obione Billardieri,* Moq.; *Theleophyton Billardieri,* Moq.); B.Fl., v., 180. *A. crystallinum* in Muell. Cens., p. 30.

A "Salt-bush." Several species of this genus are indigenous in England, where they go by the name of "Orache."

This herb vegetates solely in salty coast sands, which, like *Cakile*, it helps to bind, on the brink of the ocean and exposed to its spray. (Mueller.)

All the colonies except Queensland and Western Australia.

13. **Atriplex campanulata,** *Benth.*, N.O., Chenopodiaceæ; B.Fl., v., 178.

"Small Salt-bush."

Salt-bushes are so appreciated by stock, that in many parts of the colonies they are far less plentiful than they used to be. Unless stock-masters can see their way clear to keep their sheep, &c., in certain paddocks, while the vegetation in others is endeavouring to recuperate, this kind of vegetation will continue to diminish, to the detriment of the pastoral industry. Greedy cropping of salt-bush without any efforts at conservation is assuredly "killing the goose with the golden eggs."

The following analysis of this salt-bush, by Mr. W. A. Dixon, will be found *Proc. Royal Society, N.S.W.*, 1880, p. 133:—

Oil	2.24
Carbohydrates	43.47
Albuminoids	12.25
Woody fibre	18.12
Ash-CO_2	23.92
	100.00
Nitrogen	1.96
Woody parts of plant	8 per cent.
Edible	92 per cent.

	On ash.	On plant.
Potash	13.61	3.25
Soda	26.22	6.27
Chloride of sodium	35.36	8.46
Lime	8.47	2.03
Magnesia	5.82	1.39
Ferric oxide	1.83	.44
Sulphuric oxide	2.62	.63
Phosphoric oxide	3.80	.91
Silica (soluble)	2.27	.54
	100.00	23.92

South Australia, New South Wales and Queensland.

14 **Atriplex halimoides,** *Lindley*, N.O., Chenopodiaceæ, (Syn. *A. Lindleyi*, *Moq.*, *A. inflata*, *F.v.M.*); B.Fl., v., 178.

A "Salt-bush."

Found over the greater part of the saline desert-interior of Australia, reaching the south and west coasts. A dwarf-bush, with its frequent companion, *A. holocarpum*, (F.v.M.), among the very best for salt-bush pasture. (Mueller.)

All the colonies except Tasmania.

15. **Atriplex nummularia,** *Lindley*, N.O., Chenopodiaceæ; B.Fl., v., 170.

"Old-man Salt-bush," or "Cabbage Salt-bush."

One of the tallest and most fattening and wholesome of Australian pastoral salt-bushes; also highly recommended for cultivation, as natural plants. By close occupation of the sheep and cattle runs, have largely disappeared, and as this useful bush is not found in many parts of Australia, sheep and cattle depastured on salt-bush country are said to remain free of fluke, and get cured of Distoma-disease, and of other allied ailments. (Mueller.)

All the colonies except Western Australia and Tasmania.

The following analysis of this salt-bush is by Mr. W. A. Dixon (*Proc. Royal Society*, *N.S.W.*, 1880, p. 133):—

Oil	2.18
Carbohydrates	42.85
Albuminoids	16.45
Woody fibre	7.24
Ash CO_2	31.28
	100.00
Nitrogen	2.63

Woody parts of plant	10 per cent.
Edible	90 per cent.

	On ash.	On plant.
Potash	15.69	4.91
Soda	29.57	9.25
Chloride of sodium	30.28	9.47
Lime	8.65	2.71
Magnesia	6.77	2.12
Ferric oxide	.64	.20
Sulphuric oxide	3.17	.99
Phosphoric oxide	4.11	1.28
Silica (soluble)	1.12	.35
	100.00	31.28

16. **Atriplex semibaccata,** *R. Br.*, N.O., Chenopodiaceæ; B.Fl., v., 175.

A perennial herb, much liked by sheep.

All the colonies except Tasmania.

17. **Atriplex spongiosa,** *F.v.M.*, N.O., Chenopodiaceæ, (Syn. *A. semibaccata*, Moq., not R.Br.); B.Fl., v., 179.

A useful salt-bush for culture.

Through a great part of Central Australia, extending to the west coast.

18. **Atriplex vesicaria,** *Heward*, N.O., Chenopodiaceæ; B.Fl., v., 172.

A "Salt-bush."

Perhaps the most fattening and most relished of all dwarf salt-bushes of Australia, holding out in the utmost extremes of drought and scorched even by the hottest winds. Its vast abundance over extensive salt-bush plains of the Australian interior, to the exclusion of almost every other bush, except *A. halimoides*, indicates the facility with which this species disseminates itself. (Mueller.)

In the interior of South-eastern Australia, also in Central Australia and Western Australia.

19. **Avicennia officinalis,** *Linn.*, N.O., Verbenaceæ, (Syn. *A. tomentosa,* Jacq.); B.Fl., v., 69.

A "Mangrove" or "White Mangrove." The "Tchoonchee" of some Queensland aboriginals, and the "Tagon-tagon" of those of Rockhampton (Queensland), and "Egaie" of those of Cleveland Bay.

The leaves of this tree are eaten by cattle, and are considered very nutritious.

All the colonies (round the coast) except Tasmania.

20. **Barringtonia acutangula,** *Gærtn.*, N.O., Myrtaceæ, (Syn. *Stravadium rubrum,* DC.); B.Fl., iii., 288.

Brandis (*Forest Flora of India*) states that the bark of this tree, mixed with pulse and chaff, is given as cattle fodder in India.

Northern Australia.

21. **Boerhaavia diffusa,** *Linn.*, N.O., Nyctagineæ, (Syn. *B. pubescens,* R.Br.; *B. procumbens,* Roxb.); B.Fl., v., 277.

Called "Goitcho" by the natives of the Cloncurry River, Northern Queensland.

The Rev. Dr. Woolls points this out as a useful forage plant, which, having a long tap root, can withstand a considerable amount of drought, whilst it affords pasture early in the season, ere the grasses are fully developed. This plant is not endemic in Australia. It is a troublesome weed in some warm countries.

In all the colonies except Tasmania.

22. **Bulbine bulbosa,** *Haw.*, N.O.,Liliaceæ, (Syn. *B. australis,* Spreng.; *B. suavis,* Lindl.; *B. Fraseri,* Kunth; *B. Hookeri,*

Kunth; *Anthericum bulbosum*, R.Br.; *A. semibarbatum*, Hook.); B.Fl., vii., 34.

"Native Onion," "Native Leek."

Mr. W. N. Hutchison, Sheep Inspector, Warrego, Queensland, reports of this plant: "Its effects on cattle, sheep and horses are almost the same, continually lying down, rolling, terribly scoured, mucous discharge from the nose, of a green and yellowish colour. Cattle survive the longest; sheep take some three days, and horses will linger for a week." In *Plants Injurious to Stock* (Bailey and Gordon) two cases of poisoning are also instanced.

All the colonies except Western Australia.

23. **Bursaria spinosa,** *Cav.*, N.O., Pittosporeæ, (Syn. *Itea spinosa*, Andr.); B.Fl., i., 115.

"Native Box."

It is greedily eaten by sheep, but its thorny character preserves it from extinction upon sheep-runs. It is very variable in bulk; usually a small scrub, in congenial localities it developes into a small tree.

All the colonies.

24. **Cassia eremophila (nemophila),** *A. Cunn*, N.O., Leguminosæ, (Syn. *C. canaliculata*, R.Br., *C. heteroloba*, Lindl.); B.Fl., ii., 287.

Mr. S. Dixon states that both the pods and leaves of this plant are eaten by stock.

In all the colonies except Tasmania.

25. **Castanospermum australe,** *A. Cunn*; N.O., Leguminosæ; B.Fl., ii., 275.

"Moreton Bay Chestnut." "Bean Tree." Called "Bogum" and "Irtalie" by the aborigines.

Stock owners are destroying this tree owing to the belief that cattle are poisoned through eating the seeds. They are, however, quite harmless when cooked, and form, in fact, part of the diet of the aborigines.

The Government Analyst of New South Wales has failed to find an alkaloid or poisonous principle in the seeds, and suggests that they may be injurious on account of their indigestibility. (*Report of Dept. of Mines, N.S.W.*, p. 46.) It is, however, to be borne in mind that the Leguminosæ are emphatically a poisonous Natural Order, although they yield some of the most valuable foods of man and beast.

Northern New South Wales and Queensland.

26. **Casuarina stricta,** *Ait.*, N.O., Casuarineæ, (Syn. *C. quadrivalvis*, Labill.; *C. macrocarpa*, A. Cunn.; *C. cristata*, Miq.; *C. Gunnii*, Hook. f.); B.Fl., vi., 195. *C. quadrivalvis* in Muell. Cens., p. 22.

"Coast She-oak." "Swamp Oak." "River Oak." "Wargnal" of the aboriginals.

Mr. S. Dixon states that in Port Lincoln (S.A.) the fallen catkins (male inflorescence) form the chief sustenance in winter, on much of the overstocked country.

The foliage is eagerly browsed upon by stock, and in cases of drought these trees are pollarded for the cattle. Old bullock-drivers say that cattle prefer the foliage of the female plant (J. E. Brown). Casuarina foliage has a pleasant acidulous taste, but it contains a very large proportion of ligneous matter.

Mr. S. Dixon (*op. cit.*) states that this tree is too sour to be very useful to ewes rearing lambs, but if sheep had only enough of it the "brake" or tenderness of fibre would often be prevented in our fine wool districts, and much money saved by the increased value a sound staple always commands.

All the colonies except Queensland and Western Australia.

27. **Casuarina suberosa,** *Otto et Dietr.*, N.O., Casuarineæ, (Syn. *C. leptoclada* Miq.; *C. mæsta* F.v. M.); B.Fl., vi., 197.

"Erect She-oak." "Forest Oak." "Swamp Oak." "River Black-oak." "Shingle Oak." "Beef Wood." "Dahl-wak" of the aborigines.

A very valuable fodder tree, largely used and much valued in the interior districts as food for stock during periods of drought. The same remarks apply more or less to all species of *Casuarina*.

All the Colonies except Southern and Western Australia.

28. **Cedrela Toona,** *Roxb.*, N.O., Meliaceæ, (Syn. *C. australis*, F.v.M.); B.Fl., i., 387. *C. australis* in Muell. Cens., p. 9.

"Ordinary Cedar." Called "Polai" by the aboriginals of Northern New South Wales; "Mumin," or "Mugurpul," by those about Brisbane; and "Woota" by those about Wide Bay, Queensland.

The leaves are used to feed cattle in India. (Gamble.) It should be observed, however, that Baron Mueller differs from Bentham in considering the Australian "Cedar" specifically distinct from the "Toon" of India. In any case the trees are so closely related that any property possessed by the one is shared by the other.

New South Wales and Queensland.

29. **Claytonia polyandra,** *F.v.M.*, N.O., Portulaceæ, (Syn. *Talinum polyandrum*, Hook.); B.Fl., i., 172.

"Coonda" of the aboriginals about Shark's Bay, Western Australia.

Sheep can largely feed on this succulent shrub for a considerable time without drinking water. (Mueller and Forrest, *Plants Indigenous about Shark's Bay, W.A., 1883.*) The same observation is doubtless true of the other *Claytonias*, and also of the closely related *Portulaca oleracea*, the common Purslane.

Interior of New South Wales, South-Western and Northern Australia.

30. **Chionanthus ramiflora,** *Roxb.*, N.O., Jasmineæ, (Syn. *C. effusiflora*, F.v.M.; *Linociera effusiflora*, F.v.M.; *L. ramiflora*, DC.; *Mayepea ramiflora*, F.v.M.); B.Fl., iv., 301. *Mayepea ramiflora*, F.v.M., in Muell. Cens., p. 92.

The fruit of this plant is the food of the jagged-tailed bower-bird (*Preonodura Newtoniana).* (Bailey.) This observation is interesting, and is the more valuable in that the vegetable foods of our indigenous fauna have very rarely been botanically determined. This plant is not endemic in Australia.

Queensland.

31. **Claytonia (Calandrinia) Balonnensis,** or **balonensis,** *Lindl.*, N.O., Portulaceæ; B.Fl., i., 172.

" Munyeroo," of natives of South Australia ; " Periculia " of natives of Central Australia. (Fragm., p. 71.)

Mr. S. Dixon states that a large mob of cattle, destined to stock a Northern Territory run, travelled some two hundred miles without a drink, which would have been altogether impossible in the absence of this succulent plant.

South Australia, New South Wales and Queensland.

32. **Conospermum Stœchadis,** *Endl.*, N.O., Proteaceæ, (Syn. *sclerophyllum*, Lindl.); B.Fl., v., 374.

Western Australia and New South Wales.

C. triplinervium, R.Br., (Syn. *C. laniflorum*, Endl. ; *C. undulatum*, Lindl.) ; B.Fl., v., 375.

Western Australia.

Baron Mueller suggests that these plants be tried on the worst desert country, as all kinds of pasture animals browse with avidity on the long, tender, and downy flower-stalks and spikes, without touching the foliage, thus not destroying the plant by close cropping.

33. **Cucumus trigonus,** *Roxb.*, N.O., Cucurbitaceæ, (Syn. *C. pubescens*, Hook. ; *C. jucundus*, F.v.M. ; *C. picrocarpus*, F.v.M.) ; B.Fl., iii., 317.

" Boomarah " of the aboriginals of the Cloncurry River, North Queensland.

Stock are said to be very fond of this plant in the Western districts of Queensland. (Bailey.) Sir Thomas Mitchell speaks of this plant covering a great area of ground, in one of his journeys in Western New South Wales.

New South Wales, Queensland, Northern and Western Australia.

34. **Daucus brachiatus,** *Sieb.*, N.O., Umbelliferæ, (Syn. *Scandix glochidata*, Labill.); B.Fl., iii., 376.

" Native Carrot."

Stock are very fond of this plant, when young. Sheep thrive wonderfully on it where it is plentiful. It is a small annual

herbaceous plant, growing plentifully on sandhills and rich soil; the seeds, locally termed "Carrot Burrs," are very injurious to wool, the hooked spines with which the seeds are armed attaching themselves to the fleece, rendering portions of it quite stiff and rigid. The common carrot belongs, of course, to this genus, and the fact that it is descended from an apparently worthless, weedy plant, indicates that the present species is capable of much improvement by cultivation. This plant is not endemic in Australia.

All the colonies.

35. **Daviesia spp.**, N.O., Leguminosæ.

"Hop Bush."

Some of these shrubs are called "Hop Bushes" on account of the pleasant bitter principle which pervades them. Horses and cattle are fond of browsing on them.

Chiefly in Western Australia, but also in New South Wales and other colonies.

36. **Dodonæa lobulata,** *F.v.M.*, N.O., Sapindaceæ; B.Fl., i., 479.

"Hop Bush."

One of the best fodder shrubs in the Lachlan district of New South Wales. The seed pods in particular contain a very pleasant bitter. There is no reason to suppose that this particular species is preferred by stock to any other of the genus, only I have not seen it recorded that sheep, cattle, &c., have actually been observed to browse upon any other, with the exception of *D. viscosa*.

Southern and Western Australia, New South Wales and Victoria.

37. **Eremophila longifolia,** *F.v.M.*, N.O., Myoporineæ, (Syn. *Stenochilus longifolius*, R.Br., *S. salicinus*, Benth., *S. pubiflorus*, Benth.); B.Fl., v., 23.

"Emu Bush," "Dogwood;" "Berrigan" of the natives.

The leaves are greedily eaten by cattle and sheep. Observations in regard to the effect on stock of browsing upon plants belonging to the *Myoporineæ* are much needed, as statements hitherto made in respect to them are not always reconcilable.

Mr. S. Dixon states that this tree is one of the first to be barked by rabbits.

All the colonies except Tasmania.

38. **Eremophila maculata,** *F.v.M.*, (Syn. *Stenochilus maculatus*, Ker.; *S. racemosus*, Endl.; *S. curvipes*, Benth.); N.O., Myoporineæ, B.Fl., v., 29.

Called "Native Fuchsia" in parts of Queensland.

This is considered poisonous by some, and by others a good fodder bush.

It does not appear to be dangerous to stock accustomed to eat it, but to others, travelling stock particularly, Mr. Hutchinson of Warrego (Q.), considers it to be deadly. The effects of this plant are always worst after rain. It appears to be most dangerous when in fruit. (Bailey and Gordon.)

All the colonies except Tasmania.

39. **Eremophila Mitchelli,** *Benth.*, N.O., Myoporineæ, B.Fl., v., 21.

"Rosewood," or "Sandalwood."

The leaves are eaten by stock. The seeds of several species are eaten by emus.

New South Wales and Queensland.

40. **Eucalpytus corynocalyx,** *F.v.M.*, (Syn. *E. cladocalyx*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 218.

"Sugar Gum."

The sweetish foliage of this tree is browsed upon by cattle and sheep; in this respect this eucalypt may be classed with one other, *E. Gunnii.* (J. E. Brown.)

South Australia.

41. **Eucalyptus Gunnii,** *Hooker f.*, (Syn. *E. ligustrina*, Miq.; *E. acervula*, Hook. f.); N.O., Myrtaceæ, B.Fl., iii., 246.

"White Swamp Gum," or "Cider Gum." It possesses some other vernacular names.

This tree also bears the name of the "Sugar Gum" because of the sweetness of the leaves, which consequently are browsed upon by stock. It is a common tree in Tasmania, where it is called "Cider Gum," as an excellent cider is made from the sap taken from it in the springtime.

Tasmania, the extreme south-eastern portion of South Australia, thence to Gippsland, and into New South Wales as far as Berrima.

42. **Eucalyptus pauciflora,** *Sieb.*, (Syn. *E. coriacea*, A. Cunn., the species name in B.Fl.; *E. plebophylla*, F.v.M.; *E. submultiplinervis*, Miq.; *E. piperita*, var. *pauciflora*, DC.; and *E. procera*, Dehn., perhaps); N.O. Myrtaceæ, B.Fl., iii., 201.

"White Gum," "Drooping Gum." It is sometimes called "Mountain Ash." It possesses other vernacular names.

The leaves of this tree are very thick, and in dry seasons are eaten by cattle. (Woolls.) Opossums have a predilection for the young foliage of this tree, so that they often kill trees of this species.

Tasmania, Victoria and New South Wales.

43. **Euphorbia alsinæflora,** *Baill.*, N.O., Euphorbiaceæ, B.Fl., vi., 49.

This plant is said to be a dangerous poison-herb to sheep. The natural order is emphatically a poisonous one.

Northern Australia.

44. **Euphorbia Drummondii,** *Boiss.*, N.O., Euphorbiaceæ, B.Fl., vi., 49.

Called "Caustic Creeper" in Queensland. Called "Milk Plant" and "Pox Plant" about Bourke.

This weed is unquestionably poisonous to sheep, and has recently (Oct., 1887) been reported as having been fatal to a flock near Bourke, N.S.W.

It has been observed that when eaten by sheep in the early morning, before the heat of the sun has dried it up, it is almost certain to be fatal. It is seldom eaten, except by travelling sheep, and when grass is scarce. Its effect on sheep is curious. The head

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Tasmania, Victoria and New South Wales.

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It has been observed that when eaten by sheep in the early morning, before the heat of the sun has dried it up, it is almost certain to be fatal. It is seldom eaten, except by travelling sheep, and when grass is scarce. Its effect on sheep is curious. The head

swells to an enormous extent, becoming so heavy that the animal cannot support it, and therefore drags it along the ground; the ears get much swollen, and suppurate. (Bailey and Gordon.)

Following is Mr. S. Dixon's remarks on this plant:—"A friend of mine fed some old ewes on the undoubtedly poisonous *E. Drummondii*, but could not kill them, although he had often lost an odd sheep or two from poison, and no other known poisonous plant exists on his property."

Throughout the colonies.

45. **Euphorbia eremophila,** *A. Cunn.* (Syn. *E. deserticola*, F.v.M.); N.O., Euphorbiaceæ, B.Fl., v., 52.

This plant should be, perhaps, placed in the "suspected" list. In the western interior some people say it is highly poisonous, others, as usual, say that they have seen sheep eat it with not the least injurious result.

Mr. Bäuerlen gathered a quantity of this plant for the Technological Museum, and appended the following note:—"The plants I send I gathered in a horse paddock. There was plenty of evidence on the plants that horses or cattle browse on it, but no injurious result is recorded at the station."

In all the colonies except Tasmania.

46. **Ficus glomerata,** *Willd.*, (Syn. *F. vesca*, F.v.M.; *Covellia glomerata*, Miq.); N.O., Urticeæ, B.Fl., vi., 178.

"Clustered Fig."

The leaves are used in India for cattle and elephant fodder. (Gamble, *Manual of Indian Timbers.*)

Queensland and Northern Australia.

47. **Flagellaria indica,** *Linn.*, N.O., Liliaceæ, B.Fl., vii., 10.

A "Lawyer Vine."

Leichhardt (*Overland Journey to Port Essington*), p. 424, speaks of his bullocks feeding heartily upon this plant, particularly as the country was most wretched and the grass scanty and hard. This plant is not endemic in Australia.

New South Wales, Queensland, and Northern Australia.

48. **Flindersia maculosa,** *F.v.M.*, (Syn. *F. Strzeleckiana*, F.v.M.; *Elæodendron maculosum*, Lindl.; *Strzeleckya dissosperma*, F.v.M.); N.O., Meliaceæ, B.Fl., i.,389. *F. Strzeleckiana* in Muell. Cens., p. 9.

"Spotted Tree," "Leopard Tree."

During periods of drought sheep become exceedingly fond of the leaves of this tree, which they greedily devour, as well as the twigs up to the size of a goose-quill, and hence the tree is in danger of extermination, as it has not the recuperative power of some trees.

Northern New South Wales and Queensland.

49. **Gastrolobium spp.,** especially **G. obovatum,** Benth.; **G. trilobum,** Benth; **G. spinosum,** Benth.,(Syn. *G. Preissii*, Meissn.), **G. oxylobioides,** Benth.; **G. calycinum,** Benth.; **G. callistachys,** Meissn., (Syn. *G. lineare*, Meissn.); **G. bilobum,** R.Br., N.O., Leguminosæ, B.Fl., ii., 101-7.

Commonly known as "Poison Bushes." At the Blackwood River, according to Oldfield, *G. calycinum* is known as the "York Road Poison Bush."

These plants are dangerous to stock and are hence called "Poison Bushes." Large numbers of cattle are lost annually in Western Australia through eating them.

The finest and strongest animals are the first victims; a difficulty of breathing is perceptible for a few minutes, when they stagger, drop down, and all is over with them. After the death of the animal the stomach assumes a brown colour, and is tenderer than it ought to be; but it appears to be that the poison enters the circulation, and altogether stops the action of the lungs and heart.* The raw flesh poisons cats, and the blood, which is darker than usual, dogs; but the roasted or boiled flesh is eaten by the natives and some of the settlers without their appearing to suffer any inconvenience. (Drummond, in Hooker's *Journal of Botany*.)

The blossoms are also frequently eaten by animals, and are, I think, the most poisonous part, for the greatest number of sheep are lost from the poisonous effect of this plant at the period of its

* See also an interesting account of some physiological experiments to ascertain the nature of the poison, *Pharm. Journ.*, vi., 312

inflorescence. When the seeds fall on the ground, the wild pigeons greedily feed and fatten on them; if the crops of these pigeons, containing the seeds, be eaten by dogs, they die; yet the pigeons themselves, when dressed, are good food, and at that season are eaten in large numbers by the settlers. Horses, so far as is known, are not affected by it, at least this is the prevailing opinion, although it is disputed by some of the settlers. (T. R. C. Walter, in *Pharm. Journ.*, vi., 311.)

With sheep who have eaten the herb, the best treatment has been found to fold them, or shut them up in a close yard, so closely packed that they can hardly move, and to keep them thus without food for thirty-six hours. (See an interesting account in *Pharm. Journ.*, vi., 311.)

In the *Flora Australiensis* a statement is quoted that *G. bilobum* is the worst of the "Poison Bushes." Certainly some of them render extensive tracts of country unoccupiable.

Western Australia.

50. **Gastrolobium grandiflorum,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 103.

"Wall-flower or Desert Poison Bush."

With one exception, this is the only *Gastrolobium* out of Western Australia, and it is the only Queensland one.

Baron Mueller identified this plant as having poisoned large numbers of cattle and sheep on the Cape River, and at the sources of the Burdekin and Flinders Rivers in 1863-4. He recommends frequent burning off on the stony ridges it frequents, with the view to its suppression or eradication.

Queensland and Northern Australia.

51. **Geijera parviflora,** *Lindl.*, (Syn. *G. pendula*, Lindl.); N.O., Rutaceæ, B.Fl., i., 364.

"Wilga," "Sheep-bush," "Dogwood" and "Willow."

Mr. S. Dixon states that sheep only are particularly fond of this bush, and it seems quite unaffected by droughts.

All the colonies except Tasmania.

52. **Geranium dissectum,** *Linn.*, (Syn. *G. pilosum*, Forst.; *G. parviflorum*, Willd.; *G. philonothum*, DC.; *G. potentilloides*, L. Hér.; *G. australe*, Nees; *G. carolinianum*, Linn.); N.O., Geraniaceæ, B.Fl., i., 296; *G. carolinianum* in Muell. Cens., p. 13.

"Crowfoot." "Terrat" of the aboriginals of Coranderrk Station, Victoria.

This plant is known and highly prized as a very superior pasture herb. It is very plentiful on the sand-hills during the springtime of good seasons. The seeds, which ripen about the end of September, are very injurious to sheep and wool, and when this plant is plentiful, often cause the death of numbers of sheep, and if the shearing is late, injure the wool to a very great extent. The seeds, which have exceedingly sharp, hard, barbed points, readily attach themselves to wool or the skins of sheep, whilst the spiral shaft, with the long crank attached, gives the whole the action of an auger, worked by the movements of the animal or the action of the wind. If the point of one of these seeds is stuck lightly into the sand on a windy day it will soon bury itself up to the base; this is how the seeds are planted by nature. Injurious as this plant is, it has its redeeming points, for it is one of our most nutritious fodder plants, all kinds of stock being exceedingly fond of it, and when cut in a green state, and before the seeds mature, it makes excellent hay.

Thoughout the colonies. This plant is not endemic in Australia.

53. **Gompholobium uncinatum.** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 46.

This small shrub is noteworthy as being very hurtful to sheep that may eat of it (*Treasury of Botany*). South Australia is quoted (*op. cit.*) as its habitat, but this is a mistake.

New South Wales.

54. **Gossypium Sturtii,** *F.v.M.*, (Syn. *Sturtia gossypioides*, R.Br.); N.O., Malvaceæ, B.Fl., i., 222.

This plant affords stock a good summer feed. (Dixon.)

South Australia and New South Wales.

55. **Heterodendron oleæfolium,** *Desf.*, N.O., Sapindaceæ, B.Fl., i., 469.

"Emu Bush." "Jiggo" and "Behreging" are aboriginal names.

The seeds, which are dry, are eaten by emus. Mr. S. Dixon states that both sheep and cattle feed greedily upon it.

All the colonies except Tasmania.

56. **Hibiscus heterophyllus,** *Vent.*, (Syn. *H. grandiflorus*, Salisb.); N.O., Malvaceæ, B.Fl., i., 212.

"Green Kurrajong." "Dtharang-gange" is an aboriginal name.

The leaves, branches, and bark of this tree are greedily eaten by cattle in winter. They are mucilaginous, in common with other plants of this natural order.

New South Wales and Queensland.

57. **Jacksonia scoparia,** *R.Br.*, var. **macrocarpa,** (Syn. *J. cupulifera*, Meissn.); N.O., Leguminosæ, B.Fl., ii., 60. *J. cupulifera* in Muell. Cens., p. 34.

A "Dogwood."

Cattle and horses relish the foliage of this small tree amazingly. (Mueller.)

Western Australia.

58. **Kochia aphylla,** *R.Br.*, N.O., Chenopodiaceæ, B.Fl., v., 188. Considered by Baron Mueller to be a variety of *K. villosa*. (Muell. Cens., p. 30.)

A "Salt-bush."

All kinds of stock are often largely dependent on it during protracted droughts, and when neither grass nor hay are obtainable I have known the whole bush chopped up and mixed with a little corn, when it proved an excellent fodder for horses. One drawback it has, its stems are very fibrous, and the older portions indigestibly so. It is the principal cause of those bezoars, or felted knobs in the manipulus of the sheep, which in very protracted droughts kill them by hundreds. When, however, the rains come, and soft herbage is abundant, these bezoars either partially dissolve, or become covered with a shiny black coating, so that they resemble a papier-maché ball. (S. Dixon.)

In all the colonies except Tasmania.

59. **Kochia pyramidata,** *Benth.*, N.O., Chenopodiaceæ, B.Fl., v., 186.

"Blue Bush."

The following analysis of this salt-bush by Mr. W. A. Dixon, is to be found in the *Proc. Royal Society, New South Wales, 1880*, p. 133 :—

Oil	2.14
Carbohydrates	32.63
Albuminoids	19.94
Woody fibre	8.04
Ash, CO_2	37.25
	100.00
Nitrogen	3.19

Woody parts of plant	37 per cent.
Edible	63 per cent.

	On ash.	On plant.
Potash	12.39	4.62
Soda	34.43	12.83
Chloride of sodium	26.67	9.93
Lime	8.75	3.26
Magnesia	7.32	2.72
Ferric oxide	1.28	.48
Sulphuric oxide	1.11	.41
Phosphoric oxide	3.98	1.48
Silica (soluble)	4.07	1.52
	100.00	37.25

South Australia, Victoria and New South Wales.

60. **Kochia villosa,** *Lindl.*, (Syn. *K. tomentosa*, F.v.M.; *K. pubescens*, Moq.; *Maireana tomentosa*, Moq.); N.O., Chenopodiaceæ, B.Fl., v., 186.

"Cotton Bush."

A valuable salt-bush, which withstands a very high temperature. But Mr. S. Dixon (*op. cit.*) states that this species is "hateful" to stock. (See *K. aphylla.*)

In all the colonies except Tasmania.

61. **Lotus australis,** *Andr.*, (Syn. *L. lævigatus*, Benth ; *L. albidus*, Lodd.) ; N.O., Leguminosæ, B.Fl., ii., 188.

All the colonies.

Lotus corniculatus, *Linn.*

All the colonies except Western Australia and Queensland.

These plants are often reputed poisonous in Australia, which is doubtless a mistake, as they make excellent fodder, and are considered valuable ingredients in meadows and pastures. (Bailey.)

Doubtless this idea has arisen owing to the poisonous nature of some leguminous bushes similar in leaf and habit. Baron Mueller, however, states (*Trans. R. S. Victoria*, vol. vi., 1861-4), that this plant causes sheep to perish, in some cases, in half an hour. The most contrary evidence as to the effect of these plants on stock is to hand from Western New South Wales.

"I am inclined to believe that many leguminous plants reputed to be poisonous are not really so, but that an excess of either foliage or seeds eaten by a hungry animal throws off such an abundance of gases, that "hoove" ensues, which is nothing more than an excessive distension of the stomach, pressing against the diaphragm, preventing the lungs from working, and the animal is really strangled to death. To this cause I attribute all the deaths (and they are very numerous) caused by *Lotus australis*, var. *Behrii*, really an excellent fodder plant, akin to the Lucernes, but when seeding, and especially after rain, if hungry sheep are allowed to feed greedily upon it they die by hundreds, while sheep in confinement, and fed solely upon it, do not die, but actually thrive, as was shown some years since in Adelaide." (S. Dixon, *op. cit.*)

62. **Malvastrum spicatum,** *A. Gray*, (Syn. *Malva spicata*, Linn. ; *M. ovata*, Cav. ; *M. timorensis*, DC., *M. brachystachya*, F.v.M.); N.O., Malvaceæ, B.Fl., i., 187.

Some squatters have considered this a valuable sheep-herb. (Bailey.) This plant is not endemic in Australia.

South Australia, New South Wales and Queensland.

63. **Marsilea quadrifolia,** *Linn.*, (Syn. *M. Brownii*, A. Braun.; *M. angustifolia*, R.Br.; *M. hirsuta*, R.Br.; *M. Drummondii*, A. Braun.); N.O., Marsiliaceæ, B.Fl., vii., 683.

"Nardoo," "Clover Fern."

This plant is much relished by stock. It grows plentifully in swamps and shallow pools of water. It is, however, better known as yielding an unsatisfactory human food in its spore-cases.

All the colonies except Tasmania.

64. **Myoporum deserti,** *A. Cunn.*, (Syn. *M. dulce*, Benth.; *M. strictum*, A. Cunn.; *M. patens*, A. Cunn.; *M. rugulosum*, F.v.M.); N.O., Myoporineæ, B.Fl., v., 5.

"Ellangowan Poison-bush" of Queensland. "Dogwood Poison-bush" of New South Wales.

This appears to be a well-authenticated poison-bush, but apparently only when in fruit. It is reported from Ellangowan, Darling Downs, Queensland, that out of a flock ot 7,000 sheep passing Yandilla (Q.), 500 succumbed to eating this plant. (Bailey and Gordon.)

All the colonies except Tasmania.

65. **Myoporum platycarpum,** *R.Br.*, *Disoon platycarpus*, F.v.M., N.O., Myoporineæ, B.Fl., v., 7.

"Dogwood." "Sandalwood."

The leaves are eaten by stock, but not, as far as I can learn, with any evil effects. It is often felled for sheep in time of drought.

All the colonies except Victoria and Queensland.

66. **Nicotiana suaveolens,** *Lehm.*, (Syn. *N. undulata*, Vent.; *N. Australasiæ*, R.Br.; *N. rotundifolia*, Lindl.; *M. fastigiata*, Nees); N.O., Solaneæ, B.Fl., iv., 469.

"Native Tobacco."

This plant grows luxuriantly on the sand-hills in the Riverina (New South Wales) in good seasons. It used, in the early days of the colonies (and in the interior districts up to quite recent years), to be manufactured into tobacco. It is readily eaten by stock.

All the colonies except Tasmania.

67. **Pimelea hæmatostachya,** *F.v.M.*, N.O., Thymeleæ, B.Fl., vi., 22.

This very handsome plant might with advantage be introduced into garden culture, but it is one of the worst of poisonous herbs, and often causes the loss of hundreds of sheep, yet their lives could, perhaps, be saved by slitting their ears soon after they had eaten the herb. (Bailey.)

Queensland.

68. **Pittosporum phillyræoides,** *DC.*, (Syn. *P. angustifolium*, Lodd.; *P. longifolium*, Putterl.; *P. Roëanum*, Putterl.; *P. ligustrifolium*, A. Cunn.; *P. oleæfolium*, A. Cunn.; *P. acacioides*, A. Cunn.; *P. salicinum*, Lindl.; *P. lanceolatum*, A. Cunn.); N.O., Pittosporeæ, B.Fl., i., 112.

Called variously "Butter-bush," "Willow Tree," "Native Willow," and "Poison-berry Tree."

In times of scarcity this tree is of great value, as it withstands drought, and sheep and cattle browse upon its foliage. Stock are so partial to it in the interior districts that it is in danger of extermination in parts, and it is a tree which should be conserved.

All the colonies except Tasmania.

69. **Plantago varia,** *R.Br.*, (Syn. *P. debilis*, Nees); N.O., Plantagineæ, B.Fl., v., 139 (where see synonymy).

"Native Plantain."

This plant is relished by stock. Speaking of an allied species *(P. lanceolata)*, an English writer observes:—"Its mucilaginous leaves are relished by sheep, and, to a certain extent, by horses and cattle, but it seldom answers as a crop, unless on very poor land where little else will grow. It was generally sown with clover, and this mixed crop is occasionally seen now on barren soils, but there can be little doubt that the plantain is inferior in produce, and probably in nutritive qualities, to many plants that would grow equally well on the same land. Mingled with grasses in permanent pasture it may be beneficial in small quantity, but tends, like all broad-leaved plants, to destroy the more delicate herbage around it."

All the colonies.

70. **Pomaderris racemosa,** *Hook.*, N.O., Rhamneæ, B.Fl., i., 421.

The leaves when chewed or soaked are found to be slightly mucilaginous. This explains the fondness that stock have for this plant. It always seems fresh and green, and stands stocking well. (S. Dixon.)

All the colonies except Western Australia and Queensland.

71. **Psoralea tenax,** *Lindl.*, N.O. Leguminosæ, B.Fl., ii., 193.

Considered a good fodder by some. (Bailey.)

New South Wales and Queensland.

72. **Pterigeron adscandens,** *Benth.*, N.O., Compositæ, B.Fl., iii., 533.

Specimens of this plant have been frequently sent to Brisbane as a poison herb. (Bailey.)

Queensland and Northern Australia.

73. **Rhagodia spp.,** N.O., Chenopodiaceæ, B.Fl., v., 151 et seq.

"Salt-bushes."

These plants are palatable to sheep and cattle on account of the salt which they contain, nearly two ounces having been obtained from two pounds of leaves. They are all more or less useful, but the two following are perhaps best known.

74. **Rhagodia Billardieri,** *R. Brown*, (Syn. *R. baccata*, Moq.; *Chenopodium baccatum*, Labill.; *R. Candolleana*, Moq.); N.O., Chenopodiaceæ, B.Fl., v., 152.

This is an important bush for binding moving sand on sea-shores. (Mueller.) It is eaten by stock.

All the colonies.

75. **Rhagodia parabolica,** *R.Br.*, (Syn. *R. reclinata*, A. Cunn.); N.O., Chenopodiaceæ, B.Fl., v., 153.

"Salt-bush."

This plant is relished by stock.

All the colonies except Tasmania.

76. **Sarcostemma australe,** *R.Br.*, N.O., Asclepiadeæ, B.Fl., iv., 328.

Called "Caustic Plant," or "Caustic Vine" in Queensland, and "Gaoloowurrah" by the aboriginals at Port Darwin.

In the Warrego district, Queensland, a great number of fat cattle have perished from eating this plant. The death of sheep from eating it is also well authenticated. (Bailey and Gordon.)

Yet Mr. S. Dixon stated that he had not known stock to touch this plant till the summer of 1880-1, when the cattle on the eastern plains of South Australia lived upon it, without water, for some months of continued drought. (*Proc. R.S., S.A.*, iv., 135.)

All the colonies except Victoria and Tasmania.

77. **Sclerolæna bicornis,** *Lindl.*, (Syn. *Chenolea bicornis*, (*Vide Proc. R.S.*, 1880); *Kentropsis lanata*, Moq.; *Anisacantha bicornis*, F.v.M.; *Bassia bicornis*, F.v.M.); N.O., Chenopodiaceæ, B.Fl., v., 195.

Bassia bicornis in Muell. Cens., p. 30. This must not be confounded with the Sapotaceous genus *Bassia* of Linn., which are usually large trees. *Genera Plantarum*, Benth., and Hook., ii., 658.

N.B.—In Mr. Dixon's paper the name is given as *Chenolea bicornis*. There is no such species. It is probably intended for *Sclerolæna bicornis*.

"Cotton-bush."

The following analysis of this Salt-bush by Mr. W. A. Dixon is in the *Proc. Royal Society, N.S.W.*, 1880, p. 133:—

Oil	2.88
Carbohydrates	56.03
Albuminoids	9.18
Woody fibre	24.91
Ash, CO_2	7.00
	100.000

Nitrogen	1.47
Woody parts of plant	6 per cent.
Edible	94 per cent.

	On ash.	On plant.
Potash	24.73	1.731
Soda	20.17	1.412
Chloride of sodium	8.24	.577
Lime	24.33	1.703
Magnesia	8.27	.579
Ferric oxide	1.28	.090
Sulphuric oxide	3.95	.276
Phosphoric oxide	5.44	.381
Silica, soluble	3.59	.251
	100,00	7,000

All the colonies except Tasmania and Western Australia.

78. **Sesbania ægyptiaca,** *Pers.*, (Syn., *Æschynomene Sesban*, Linn.); N.O., Leguminosæ, B.Fl., ii., 212.

"Ngeen-jerry" of the aboriginals of the Cloncurry River (North Queensland).

The leaves and branches are cut for cattle-fodder in India. (Gamble.)

Northern Australia.

79. **Sida rhombifolia,** *Linn.*, N.O., Malvaceae, B.Fl., i., 196.

"Common Sida Weed," "Queensland Hemp." Called "Paddy Lucerne" in the Clarence and Richmond River districts of New South Wales. It is often called "Native Lucerne" in other parts of the colony.

It may not be generally known that the ripe carpels of this weed often cause the death of fowls that feed on them, by the sharp terminal arms of the carpels irritating the inside and causing inflammation. (F. M. Bailey.)

The leaves are mucilaginous, as are also the tops, and cattle are very fond of them. They are, however, unable to destroy the plants, by reason of the very strong fibre of the stems.

New South Wales to Northern Australia.

80 **Solanum eremophilum,** *F.v.M.*, N.O., Solaneæ, B.Fl., iv., 459.

Between Cobham and Mount Arrowsmith (New South Wales) an old drover stated that he has repeatedly seen sheep and cattle die after eating this pretty blue and purple plant.

81. **Solanum simile,** *F.v.M.*, (Syn. *S. laciniatum*, var., R.Br.; *S. fasciculatum*, F.v.M.); N.O., Solanaceæ, B.Fl., iv., 448.

Called "Quena" by aboriginals in South Australia.

Sheep feed on this plant. (Annie F. Richards in *Proc. R.S., S.A.*, iv. 136.)

All the colonies except Tasmania and Queensland.

82. **Sterculia diversifolia,** *G. Don.*, (Syn. *Brachychiton populneum*, R.Br.; *Pœcilodermis populnea*, Schott.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton populneum* in Muell. Cens., p. 15.

"Kurrajong," or "Black Kurrajong;" the "Bottle Tree" of Victoria.

Cattle and sheep are fond of the leaves and branches, and in some dry seasons have existed for long periods on scarcely anything else. In parts of the Riverina (New South Wales) the trees are cut down as required for this purpose. (*General Report, Sydney International Exhibition, 1879.*)

Victoria, New South Wales and Queensland.

83. **Swainsonia spp.,** N.O., Leguminosæ, B.Fl., ii., 216 et seq.

"Native Indigos."

These plants are reputed poisonous to stock. The active principle does not appear to have been isolated, as it only exists during certain stages of growth (prior to flowering) of the plant, and it seems to be decomposed on drying the plant. The real nature of the poison will, therefore, probably remain undetermined until such time as a chemist can work at the plant on the spot, or take steps to receive a perfectly fresh supply of it.

Throughout the colonies.

84. **Swainsonia galegifolia,** *R.Br.*, (Syn. *S. Osbornii*, Moore; *Vicia galegifolia*, Andr.; *Colutea galegifolia*, Sims); N.O., Leguminosæ, B.Fl., ii., 217.

"Darling Pea," "Indigo Plant."

This is a dreaded plant from the great amount of loss it has inflicted on stock-owners. Its effect on sheep is well known; they separate from the flock, wander about listlessly, and are known to the shepherds as "pea eaters," or "indigo eaters." When once a

sheep takes to eating this plant it seldom or never fattens, and may be said to be lost to its owner. The late Mr. Charles Thorn, of Queensland, placed a lamb which had become an "indigo eater" in a small paddock, where it refused to eat grass. It, however, ate the indigo plant greedily, and followed Mr. Thorn all over the paddock for some indigo he held in his hand.

At Taroom (Q.) horses were hobbled for the night at a place where much of this plant was growing. On the following morning they were exceptionally difficult to catch, and it was observed how strange they appeared. Their eyes were staring out of their heads, and they were prancing against trees and stumps. The second day two out of nine died, and five others had to be left at the camp. When driven they would suddenly stop, turn round and round, and keep throwing up their heads as if they had been hit under the jaw; they would then fall, lie down for a while, rise, and repeat the agonising performance. On one station, in the course of a few weeks, eight head were shot, having injured themselves past hope of recovery. *Plants Injurious to Stock* (Bailey and Gordon).

The Rev. Dr. Woolls, however, points out *(Proc. Linn. Soc., N.S.W.*, vii., 315), that from experiments made near Mudgee, New South Wales, it does not appear that this species is deleterious when eaten with other herbage.

New South Wales and Queensland.

85. **Swainsonia Greyana,** Lindl., (Syn. *S. grandiflora*, R.Br.); N.O. Leguminosæ, B.Fl., ii., 216.

"Poison Bush."

This plant is reported to cause madness, if not death itself, to horses. The poison seems to act on the brain, for animals affected by it refuse to cross even a small twig lying in their path, probably imagining it to be a great log. Sometimes the poor creatures attempt to climb trees, or commit other eccentricities. (Woolls.) It is regarded with great horror on the Darling, especially in dry seasons, when other herbage fails. Baron Mueller believes in the poisonous properties attributed to this

particular species. (*Trans. R.S. Victoria*, vol. vi., 1861-4.) It would appear to be very similar in its effects to the preceding species.

"I may add that this plant is popularly supposed to produce a sort of insanity, ending in some cases in death, in stock that feed upon it. I am of opinion that this is incorrect; I have never seen any stock actually feeding upon it, but I have seen horses eat freely, without any evil effect, of another species of the same genus (?), which grows plentifully on the black soil flats which are at times inundated by the waters of the Darling. The Hon. William Macleay, who has had large experience in a district where this plant grows, informed me a few days ago that he also was of opinion that it is not poisonous to stock." (*H. R. Whittall, in Proc. Linn. Soc. N.S.W.*, ix., 179.) As testimony in regard to the properties of *S. Greyana*, this is a little vague, but I have given it litteratim.

South Australia, Victoria, New South Wales and Queensland.

86. **Tephrosia purpurea**, *Pers.*, (Syn. *T. piscatoria* and others, Pers.); N.O., Leguminosæ, B.Fl., ii., 209.

These species possess properties deleterious to stock. The latter was reported from the Flinders River, Queensland, as a poison herb. (Bailey and Gordon.) **T. rosea**, *F.v.M.*, is also poisonous.

South Australia, New South Wales to Northern Australia.

87. **Trachymene australis**, *Benth.*, (Syn. *Didiscus pilosus*, Benth.; *D. anisocarpus*, F.v.M.; *D. grandis*, F.v.M.; *Dimetopia anisocarpa*, Turcz; *D. grandis*, Turcz.); N.O., Umbelliferæ, B.Fl., iii., 349. *Didiscus pilosus* in Muell. Cens., p. 62.

"Wild Parsnip."

Recently (December, 1887) the sudden death of numbers of cattle in the vicinity of Dandenong, Victoria, was attributed to their having eaten a plant known as the wild parsnip. Baron Mueller pronounced specimens forwarded to him by the Chief

Inspector of Stock to belong to this species. Its action is so powerful that no remedial measures seem to be of any avail. The only way to destroy the plant is to pull it up by the roots and burn it.

In all the colonies.

88. **Trema aspera,** *Blume.*, (Syn. *Celtis aspera*, Brong; *Sponia aspera*, Planch.); N.O., Urticeæ, B.Fl., vi., 158. This, and other species of *Trema* recorded by Bentham, are all united by Baron Mueller under the typical *T. cannabina*, Lour., (*Vide* Muell. Cens., p. 21.)

" Peach-leaved poison bush." " Elm." " Rough Fig." A " Kurrajong."

This shrub is firmly believed by some to be poisonous. It is likely very indigestible, as it produces an excellent strong fibre. (Bailey.)

All the colonies except South and Western Australia.

89. **Trichodesma zeylanicum,** *R.Br.*, (Syn. *Pollichia zeylanica*, F.v.M.); N.O., Boragineæ, B.Fl., iv., 404. *P. zeylanica* in Muell. Cens., p. 100.

Baron Mueller recommends this plant as a fodder herb, stating that the dromedaries of Giles' exploring party (1873-4) were found to be particularly partial to it. It is not endemic in Australia.

All the colonies except Victoria and Tasmania.

90. **Trigonella suavissima,** *Lindley*, N.O., Leguminosæ, B.Fl., ii., 187.

From its abundance in the neighbourhood of Menindie it is often called " Menindie Clover." It is the " Australian Shamrock" of Mitchell, and the " Calomba " of the natives of the Darling.

This perennial, fragrant, clover-like plant is a good pasture herb. Sir Thomas Mitchell (*Three Expeditions*) speaks of it in the highest manner as a forage plant on several occasions.

Interior of Australia, from the Murray River and tributaries to the vicinity of Shark's Bay, Western Australia.

91. **Ventilago viminalis,** *Hook.;* N.O., Rhamneæ, B.Fl., i., 411.

"Supple Jack." "Thandorah" of the aboriginals of the Cloncurry River (North Queensland).

The leaves are eaten by stock.

South Australia, New South Wales and Queensland.

92. **Zizyphus jujuba,** *Lam.;* N.O., Rhamneæ, B.Fl., i., 412.

"Jujube Tree."

The leaves are much valued for cattle-fodder in India.

Queensland.

SUBSTANCES REPUTED MEDICINAL. (DRUGS).*

IN regard to the "New Remedies," it will be well to remember the judicious remarks of Sir Joseph Hooker in his introductory essay on the Flora of Australia, appended to the *Flora of Tasmania*.

"I have not alluded to pharmaceutical plants: such may exist, and multitudes of the weeds, seeds, and roots of Australia will no doubt enjoy a more or less substantial reputation as drugs for a period, and then be consigned to oblivion. This is the pharmaceutical history of the plants of all countries that have long been inhabited by civilised man, and Australia will form no exception to them, the fact being, that of the multitude of names of plants that appear in Pharmacopæias, the number of really active and useful plants is extremely small."

Queensland is by far the richest of the colonies in plants concerning which medicinal properties have been recorded; but the great majority of these will be found to be also common to India and the Archipelago, and to have been employed by the natives of those countries.

With the exception of some plants not endemic in Australia, which have already been utilized by dwellers in older countries, most of the plants of this continent reputed medicinal, have been enquired into only when their true botanical positions were assigned. We are aware that certain properties are possessed by plants belonging to certain genera and natural orders; when an Australian plant is found to belong to such an

* See also "Essential Oils," "Gums," &c. The species found in New South Wales are dealt with in a paper read by the author before the Linnean Society of New South Wales, March, 1888, entitled *Some Reputed Medicinal Plants of New South Wales.*

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order or genus, we can usually make a very sagacious surmise as to its properties. The science of botany, therefore, may save the student of Materia Medica from groping about and testing plants in an empirical way. Nevertheless, there is still much empiricism in the study of vegetable Materia Medica, as it is only of comparatively recent years that the analyst and physician have recognised the enormous mutual advantage of co-operation with the botanist. Yet comparatively few genera have been tested for medicinal properties throughout the world, so that the limit of the aid afforded us by analogy is easily passed.

Australian botany may be said to have been brought into order by the publication of the *Flora Australiensis*, the oldest volumes of which only date back some twenty-five years. Before that time very few people in these colonies professed any botanical knowledge whatsoever, and our plant-nomenclature was in a pitiable state, empirics adding to the prevalent lack of knowledge by bestowing names on plants without a word of description, increasing the difficulty of the situation by synonymy worse than useless. Anyone need only examine old exhibition literature to be convinced of the truth of my remarks. To Baron Mueller and Mr. Bentham are, of course, mainly owing the "exact" position which Australian botany holds in this centenary year. The main work of the classification of our plants has already been performed, and the student of Materia Medica now can reap the advantage. There is no doubt that many observations of early colonists on the medicinal properties of plants have been lost to us through their lack of botanical knowledge, or lack of facilities to have plants named in which they were interested. And considering the circumstances under which many of the pioneers of this colony worked, it becomes a matter of surprise to us, not that they have recorded so little, but that they have been recorded so much, and in such detail, in regard to the economic properties of our indigenous flora. Of course, drugs form but one group or division of substances which have been pressed into the service of man.

In fairness to ourselves we must confess ourselves very little indebted to the Australian aboriginal for information as to the medical (or in fact any other) properties of our plants. The

poor aboriginal chiefly takes interest in the vegetation as supplying him with his scanty food, or as affording him fibre useful in securing fish and other animal sustenance. As far as we know, the Materia Medica of the blacks is of a very meagre description, yet the acquisition of even such little knowledge as they are supposed to possess has been slow and difficult, inasmuch as persons who have lived in a state of nature with them have not been distinguished for either their medical or botanical knowledge. Civilised or semi-civilised blacks frequently know but little about their native Materia Medica, and the difficulty of obtaining reliable information is enhanced (as I have experienced to a slight extent) through the extreme willingness of town blacks to impart information in regard to any plant which may be shown them, which impresses one with the thought that they are too willing to oblige. But perhaps this is mainly owing to asking them leading questions.

With the native Materia Medica of India, for instance, the case is very different. While some remedies are evidently used fancifully, and others for every disease to which the human frame is liable, much of the knowledge in regard to it is exact, the outcome of intelligent observation and enquiry, and the work of the European practitioner to classify the native drugs is a comparatively easy one.

There is an important matter which I have often heard referred to by medical men and others. It may be only an ingenious surmise, but I am inclined to think it is more than that, as evidence to prove its truth is from time to time brought forward. It is this. Native Australian drugs will probably be found peculiarly efficacious in the treatment of diseases, or modifications of diseases, which are co-extensive with their distribution.

The number of really useful New South Wales drugs, as far as our knowledge at present extends, is, as will be seen, but very limited, and in regard to these even, our knowledge lacks precision. It will thus be seen how little trodden has been this particular field of enquiry. Yet it is not too early even now to attempt to systematise such knowledge as we possess—this has been the object in view in submitting the few pages which follow.

1. **Abrus precatorius**, *Linn.*, (Syn. *A. pauciflorus*, Desv.; *A. squamulosus*, E. Mey.); N.O., Leguminosæ, B.Fl., ii., 270.

"Indian Liquorice."

The roots of this plant are used in India as a substitute for liquorice, though they are somewhat bitter. In Java the roots are considered demulcent. The leaves, when mixed with honey, are applied to swellings, and in Jamaica are used as a substitute for tea. Under the name of "Jequirity" the seeds have recently been employed in cases of ophthalmia, a use to which they have long been put in India and Brazil.

Queensland and Northern Australia.

2. **Abutilon indicum**, *G. Don.*, (Syn. *A. asiaticum*, G. Don; *Sida indicum*, Linn.; *S. asiatica*, Linn.); N.O., Malvaceæ, B.Fl., i., 202.

This species, together with many others of this natural order, possesses demulcent properties, and is used for that reason.

Queensland and Northern Australia.

3. **Acacia spp**, N.O., Leguminosæ.

"Wattles."

The barks of all wattles are more or less astringent (see "Tans"), and are used in domestic medicine to make decoctions or infusions employed in diarrhœa or dysentery, perspiring feet, some affections of the eyes, and a number of severe and trifling ailments in which an astringent may or may not be of service.

The medicinal properties of these barks are discussed in a paper by Dr. S. J. Margarey on *A. pycnantha*, in *Trans. R.S. South Australia*, iii., xiv.

The astringent principle (accompanied by no injurious substance in large quantity) is present to a more or less useful extent in the barks of scores of genera of our native trees, *e.g.*, *Eucalyptus*, *Banksia*, *Casuarina*.

The gums of some species of wattle are used to a limited extent in domestic medicine and surgery. (*Vide Flindersia maculosa*, infra.)

Throughout the colonies.

4. **Acacia delibrata,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 404.

Dr. Bancroft, of Brisbane, has found a saponin in the pods. Physiologically, it was found to act as an irritant poison. It has a very disagreeable taste, and is soluble both in alcohol and water.

Queensland and Northern Australia.

5. **Acacia falcata,** *Willd.*, (Syn. *A. plagiophylla*, Spreng.; *Mimosa obliqua*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 361.

"Hickory." "Lignum-Vitæ." "Sally." It used to be called "Wee-tjellan" by the aboriginals of the counties of Cumberland and Camden (New South Wales).

This bark, which contains much tannin, was used by the aboriginals of the counties of Cumberland and Camden to stupefy fish, and to make embrocations for the cure of cutaneous diseases. (Macarthur.)

New South Wales and Queensland.

6. **Acacia implexa,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 389.

The Rev. Dr. Woolls observes that the bitter bark of this tree probably possesses medicinal properties. The bark of young trees contains a very pleasant bitter.

Victoria, New South Wales and Queensland.

7. **Acacia penninervis,** *Sieb.*, (Syn. *A. impressa*, Lindl.); N.O., Leguminosæ, B.Fl., ii., 362.

"Hickory." "Blackwood."

The bark (and, according to some, the leaves) of this tree was formerly used by the aboriginals of southern New South Wales for catching fish. They would throw them into a water-hole, when the fish would rise to the top and be easily caught. Neither the leaves nor bark contain strictly poisonous substances, but, like the other species of *Acacia*, they would be deleterious, owing to their astringency.

All the colonies except South and Western Australia.

8. **Acacia salicina**, var. **varians**, *Lindl.*, (Syn. *A. varians*, Benth.); N.O., Leguminosæ, B.Fl., ii., 367.

The "Goobang" of the natives of the western interior of New South Wales.

Sir Thomas Mitchell speaks of the natives using a bough of this tree to poison the fish in water-holes.

In the interior.

9. **Achras laurifolia**, *F.v.M.*, (Syn. *Sersalisia laurifolia*, A. Rich.; *S. glabra*, A. Gray; *Sideroxylon Richardi*, F.v.M.); N.O., Sapotaceæ, B.Fl., iv., 282. *Sideroxylon Richardi* in Muell. Cens., p. 92.

This bark has a remarkably sweet taste, but is at the same time astringent. Dr. Bancroft suggests that lozenges made of an extract of it might prove useful in throat diseases. Following is an analysis by Mr. Staiger:—

Extract (containing glycyrrhizin)	30.0
Tannin	12.0
A substance intermediate between India-rubber and gutta-percha	0.25
Woody fibre	50.0
Moisture	7.75

New South Wales and Queensland.

10. **Achyranthes aspera**, *Linn.*, (Syn. *A. australis*, R.Br.; and incl. *A. canescens*, R.Br.; *A. argentea*, Lam.); N.O., Amarantaceæ, B.Fl., v., 246.

Found also in all the tropical and sub-tropical regions of the old world. The herb is administered in India in cases of dropsy. The seeds are given in hydrophobia, and in cases of snake-bites, as well as in ophthalmia and cutaneous diseases. The flowering-spikes, rubbed with a little sugar, are made into pills, and given internally to people bitten by mad dogs. The leaves, taken fresh and reduced to a pulp, are considered a good remedy when applied

externally to the bites of scorpions. The ashes of the plant yield a considerable quantity of potash, which is used in washing clothes. The flowering spike has the reputation in India (Oude) of being a safeguard against scorpions, which it is believed to paralyse. (Drury.)

South Australia, New South Wales, Queensland and Northern Australia.

11. **Adiantum æthiopicum,** *Linn.*, (Syn. *A. assimile*, Swartz; *A. trigonum*, Labill.); N.O., Filices, B.Fl., vii., 724.

Common "Maidenhair Fern."

This plant is said to possess medicinal properties, being slightly astringent and emetic. It has been used in Europe in making "*Sirop de Capillaire*," a demulcent drink, employed in diseases of the chest.

All the colonies.

12. **Alstonia constricta,** *F.v.M.*, N.O., Apocyneæ, B.Fl., iv., 314.

"Fever Bark." "Bitter Bark."

This yellowish-brown, often thick and deeply fissured bark, is intensely bitter, and possesses valuable febrifugal and tonic properties. It is regularly quoted in London drug lists. A decoction is sometimes sold in the colonies as "bitters." Mr. Christy states that it is used by some English brewers of pale ale for export, as it produces neither headaches nor other ill effects of hops. It tastes remarkably like Cinchona bark, and seems to partake somewhat of the properties of both quinine and nux vomica. This drug is undoubtedly worthy of careful experiments by medical men. (See *A. scholaris*.)

The bark contains, according to Palm (who examined it in 1863), a neutral resinous bitter principle, called by him *alstonin*, similar to *cailcedrin* and *tulucunin*, a volatile oil, smelling like camphor, an iron-greening tannin, gum, resin, fat, wax, protein substance, oxalic acid, and citric acid. The ash, amounting to 6.06 per cent. of the bark, contains in 100 parts :—

Soda (anhydrous)	0.48
Potash „	6.96
Sodium Chloride	3.06
Lime	32.83
Magnesia	3.61
Ferric oxide	3.43
Manganoso-manganic oxide... ...	0.78
Sulphuric acid (anhydride)	9.33
Phosphoric peroxide	trace
Silica	15.60
Carbonic acid	23.50

(*Watts' Dict.*, vi., 1st suppt., 101.)

Mueller and Rummel, in Wittstein's *Organic Constituents of Plants*, give the following account of the alkaloid :—*Alstonin*, the alkaloid of the bark of *Alstonia constricta*, F.v.M., is obtained by treating the alcoholic extract with water and a little hydrochloric acid, adding to the filtered solution a small excess of ammonia, dissolving the separated flocculent precipitate in ether, evaporating the ethereal solution, and purifying the remaining alkaloid (*alstonin*) by dissolving again in dilute acid and repeating the above process. It forms an orange yellow, brittle, pellucid mass, of very bitter taste, melts below 100°, and is carbonised at higher temperatures; dissolves easily in alcohol, ether, and dilute acids, but sparingly in water. All its solutions in the dilute state exhibit a strong blue fluorescence which is not affected by acids or alkalies. Its alcoholic solution has a slightly alkaline reaction. *Alstonin* combines with acids, but does not completely neutralise them. Hydrochloric and other strong acids, also alkalies, decompose it partly on evaporation in the water-bath to a dark-coloured acid substance. The *hydrochloride of alstonin* gives precipitates with the chlorides of platinum and mercury, iodide of potassium, the phospho-molybdate and meta-tungstate of soda, bichromate of potash, picric acid, and with the alkalies and alkaline carbonates. Tannic acid does not precipitate the hydrochloride, but does the acetate and the pure base. Concentrated nitric acid dissolves *alstonin* with crimson colour, yellow on warming; sulphuric acid reddish-brown, afterwards dirty green; hydrochloric acid only

effects a yellowish solution. *Alstonin* differs from *ditamine* chiefly by its behaviour towards concentrated acids, and by its fluorescence, which has not been recorded of the other alkaloid.

The correctness of the above results has been disputed by Hesse, who expressed the opinion that the supposed alkaloid was a mixture of *chlorogenine* and *porphyrine*. (*Ber. d. Deutsch. Chem. Gessells, 1878*, p. 2175.)

In June, 1879, Oberlin and Schlagdenhauffen* announced the isolation of two alkaloids from this bark, a crystallizable and an amorphous one. They found the bark to be soluble in ether to the extent of 1.038 per cent., and to this ethereal extract their attention was confined. In *Pharm. Journ.* [3], ix., 1059, is an abstract of their paper, and an account is given not only of the method of preparing these alkaloids, but also of their physical and chemical properties. The crystalline alkaloid occurring in silky tufts of brilliant, colourless, isolated, or stellate crystals, is styled *alstonine*†, while an amorphous nitrogenous residue, possessing alkaloid properties, obtained by spontaneous evaporation from the mother liquor which yielded *alstonine*, is provisionally termed *alstonicine*.

In 1881 an exhaustive research on this bark was contributed by Hesse to the *Annalen der Chemie*, ccv., 360, of which a careful abstract appears in the *Pharm. Journ.* [3] xi., 775. Palm's *alstonin* (notwithstanding the alleged absence of nitrogen) was shown by Hesse to consist essentially of an alkaloid which he had obtained from the bark and called *chlorogenine*. But as Palm's name had priority, Hesse called the alkaloid *alstonine*. But unfortunate confusion has arisen in Mueller and Rummel and Oberlin and Schlagdenhauffen (*vide supra*) also having given so descriptive a name to substances of different composition. The abstract above referred to gives a very lucid account of the overlapping of various researches, and shows how the different products obtained by different observers may be reconciled. After this necessary preliminary statement, Hesse gives a full account of the preparation and properties of the alkaloids found by him. They are:—

* *Journal de Pharmacie et de Chimie.* † Probably Hesse's *porphyrine*.

1. *Alstonine* (synonymous with *chlorogenine*, and probably identical with Palm's *alstonin*.) It is a brown, amorphous mass, which can be rubbed to a brownish-yellow powder.

2. *Porphyrine*, a white powder found in very small quantity.

3. *Porphyrosine*, the examination of which is not yet complete.

4. *Alstonidine*, consisting of colourless, concentrically grouped needles.

Hesse believes that this list by no means completely enumerates the alkaloids obtainable from this interesting bark.

New South Wales and Queensland.

13. **Alstonia scholaris**, *R.Br.*, (Syn. *A. cuneata*, Wall.); N.O., Apocyneæ, B.Fl., iv., 312.

"Devil Tree" of India. "Dita Bark."

The powerfully bitter bark of this tree is used by the natives of India in bowel complaints. *(Treasury of Botany.)* It has proved a valuable remedy in chronic diarrhœa and the advanced stages of dysentery. It has also been found effectual in restoring the tone of the stomach and of the system generally in debility after fevers and other exhausting diseases. *(Pharm. of India.)* It is officinal in the Pharmacopœia of India as an astringent tonic, anthelmintic, and antiperiodic. It is held in the highest repute in the Phillippine Islands. For further information see Dymock *(Materia Medica of Western India)*. Most writers who speak of it at all speak of it in terms of the highest praise. A very full account of the various substances which have been extracted from this bark will be found in *Watt's Dict.*, 3rd suppt., Part i., page 688 *et seq.*

Northern Queensland.

14. **Ammannia indica**, *Lam.*, (Syn. *A. vesicatoria*, Roxb.); N.O. Lythrarieæ, B.Fl., iii., 296. Not in Muell. Cens.; the Baron, therefore, probably considers it introduced.

The whole plant has a strong aromatic smell. The leaves are acrid, and are commonly used by the natives of India to raise

blisters in rheumatic pains, fevers, etc. The fresh leaves bruised perform their office effectually in half-an-hour. (F. M. Bailey.)

Queensland and North and South Australia.

15. **Antidesma Dallachyanum**, *Baill.*, N.O., Euphorbiaceæ, B.Fl., vi., 85.

"Herbert River (Queensland) Cherry."

The fruit, which in size equals that of large cherries, is of a sharp acid flavour, resembling that of the red currant, which it also equals in colour when made into jelly; and as the European fruit is placed among medicinal plants on account of its juice being grateful to the parched palates of persons suffering from fever, this is worthy of a similar place. (Bailey.)

The same remarks are applicable to many of the sub-acid fruits mentioned under "Foods."

Queensland and Northern Australia.

16. **Archidendron Vaillantii**, *F.v.M.*, (Syn. *Pithecolobium Vaillantii*, F.v.M.; *Albizzia Vaillantii*, F.v.M.); N.O., Leguminosæ; Mueller, Fragm., v., 9, and ix., 178.

The pods contain beans which possess a black colour, and nauseous, hot taste. The bark also is hot and acrid. Alcoholic extract of the dried bean was made, five grains of which, suspended in a few minims of water, were injected under the skin of a kitten, which died asphyxiated in a few hours. The bark was found to be more poisonous than the bean or leaves. Guinea-pigs poisoned with this substance have painful convulsive movements of the whole muscular system, increasing in frequency and force as the poison gets absorbed. The hind legs get paralysed, and the animals lie in a helpless state for many hours before they die, and utter feeble cries when moved about. After death the muscles contract when cut across, or when stimulated through their nerves up to their exit from the cord. Neither the motor nor the sensory nerves seem to be affected. This substance kills by paralysing the reflex function of the spinal cord. (Dr. Bancroft, in *Proc. R.S. N.S.W.*, 1886, *p.* 70.)

Queensland.

17. **Asparagus racemosus**, *Willd.*, (Syn. *A. fasciculatus*, R.Br.; *Asparagopsis floribunda*, Kunth; *A. Brownei*, Kunth; *A. Decaisnei*, Kunth); N.O., Liliaceæ, B.Fl., vii. 17.

The roots of this plant are used medicinally by the natives of India, but they appear to be wholly unworthy of notice. *(Pharm. of India.)* An account of some of the uses to which it is put by them will be found in Drury's *Useful Plants of India*, *p.* 56.

Queensland and Northern Australia.

18. **Atherosperma moschata**, *Labill.*, N.O., Monimiaceæ, B.Fl., v., 284.

"Sassafras" (see Doryphora).

The bark contains an agreeable bitter, of much repute as a tonic amongst sawyers. It is called Native Sassafras from the odour of its bark, due to an essential oil closely resembling true sassafras in odour. Bosisto likens the smell of the inner bark to new ale, and says that a decoction from this part of the tree is a good substitute for yeast in raising bread. It is diaphoretic and diuretic in asthma and other pulmonary affections, but it is known more especially for its sedative action on the heart, and it has been successfully used in some forms of heart disease.

It is prepared of the strength of 4 ounces of the bark to 20 ounces of rectified spirit, and is given in doses of 30 to 60 drops, usually on a lump of sugar. The volatile oil of the bark alone is said to have a lowering action on the heart. See "Volatile and Essential Oils."

The bark has been examined by N. Zeyer, who has found in it volatile oil, fixed oil, wax, albumin, gum, sugar, starch, butyric acid, an aromatic resin, iron-greening tannic acid, and an alkaloid which he designates *atherospermine*. The lead-compound of the tannic acid was obtained by precipitating the clarified aqueous decoction of the bark with lead acetate, digesting the well-washed precipitate with acetic acid, and exactly saturating the filtrate with ammonia. The greyish-yellow precipitate thus formed gave by analysis, after drying, numbers corresponding to the formula $C_{10} H_{14} PbO_3$."

When the bark, after being boiled with water and treated with dilute sulphuric acid, is exhausted with weak sodaley, the *aromatic resin* passes into solution, and may be separated by precipitation with hydrochloric acid, and purified by treatment with alcohol and water. It is brown-red, has a faint aromatic odour, tastes distinctly like nutmeg and sassafras, melts at 114°, dissolves easily in alcohol and in alkaline hydrates and carbonates, but with difficulty in ether and turpentine oil. The analysis of the resin gave numbers according to the formula $C_{21}\,H_{32}\,O_5$.

The ash, amounting to 3.64 per cent. of the air-dried bark, and 4.06 per cent. of the bark dried at 100°, was found by Zeyer to contain :—

Sodium chloride	2.675
Potash (anhydrous)	4.036
Soda do.	8.321
Lime	45.445
Magnesia	4.361
Alumina	0.191
Ferric oxide	0.098
Manganic oxide	0.447
Sulphuric acid (anhydride)	1.442
Phosphoric pentoxide	1.186
Silica	1.396
Carbonic Acid	30.005

Atherospermine. The solution filtered from the impure lead-precipitate, already said to have been obtained by N. Zeyer, yields, on addition of ammonia, a precipitate which, after washing and drying, digestion with alcohol, evaporation of the brown solution, mixing of the remaining mass with hydrochloric acid, and precipitation with ammonia, yields crude *atherospermine*; and by agitating this substance with carbon bisulphide, dissolving the mass left after evaporating off the carbon bisulphide in hydrochloric acid, and again precipitating with ammonia, the *atherospermine* is obtained in the pure state.*

* The bark, which had been boiled with water for the preparation of the tannic acid still retained a portion of the alkaloid, which was extracted therefrom by digestion with dilute sulphuric acid.

Atherospermine forms a white, somewhat greyish, light, highly electric powder, inodorous, and having a pure bitter taste. It turns yellowish when exposed to sunshine, melts at 128°, and at a higher temperature emits an empyreumatic odour, takes fire, and burns away without residue; when slowly heated it gives off an odour of putrid meat, and afterwards of herrings (*propylamine?*). It is nearly insoluble in water, dissolves with difficulty in ether, more easily in alcohol, the solution having a distinct alkaline reaction; is soluble also in chloroform, oil of turpentine, and other volatile oils. When dissolved in dilute acids, it neutralises them with formation of varnish-like salts. In contact with iodic acid and a little water, it liberates iodine with brown colour. The neutral solution of the alkaloid in hydrochloric acid is precipitated white by alkalies and alkaline carbonates, yellow by picric acid, yellowish-white by tannic acid, dirty-yellow by phosphomolybdic acid, pale yellow by platinic chloride; it likewise precipitates with iodide, ferrocyanide and sulphocyanide of potassium, auric chloride, &c. The formula of *atherospermine* has not yet been ascertained. (Zeyer in *Watt's Dict.*, vi., suppt., 231.)

The following account of *Atherospermine* will also be interesting:—

Atherospermine—$C_{30}H_{20}NO_5$ (?) Alkaloid of the bark of *Atherospermine moschatum*. Extract with warm water, acidified by sulphuric acid, and precipitate with carbonate of soda. Wash and dry the precipitate and extract with bi-sulphide of carbon. Distil with water containing sulphuric acid, precipitate the remaining liquid with ammonia, wash and dry the deposit. It is a white, voluminous, highly electric powder, of crystalline appearance under the microscope, and of a pure and lasting bitter taste. Water dissolves only traces of it, but acquires a bitter taste; ether dissolves at 16° one-thousandth, when boiling, one-hundredth; alcohol of 93 per cent. at 16° one-thirty-second part, at the boiling point half its weight. Of greater solvent power are chloroform, bi-sulphide of carbon, oil of turpentine and other essential oils and diluted acids. Chlorine-water produces a yellow solution, not changeable by ammonia. Iodic acid gives with *atherospermine* the same re-action as towards morphine and

oxyanthine, viz., it becomes deoxidised, and iodine is set free. The neutral solution of *chloride of atherospermine* gives a white precipitate with corrosive sublimate, a pale greenish-yellow with chloride of platinum, and a yellow or orange precipitate with nitrate of palladium. (Mueller and Rummel in *Wittstein's Organic Constituents of Plants.*)

Tasmania, Victoria and New South Wales.

19. **Barringtonia acutangula,** *Gaertn.*, (Syn. *Stravadium rubrum*, DC.); N.O., Myrtaceæ, B.Fl., iii., 288.

In India an extract or juice is obtained from the leaves of this tree which, when mixed with oil, is used in native practice for eruptions of the skin. The kernels, powdered and prepared with sago and butter, are used in diarrhœa; mixed with milk they produce vomiting (*Treasury of Botany*). The root is bitter, and is said to be similar to Cinchona, but also cooling and aperient. (Drury.)

Northern Australia.

20. **Barringtonia racemosa,** *Gaud.;* N.O., Myrtaceæ, Muell. Cens., p. 29.

"Yakooro" of the aboriginals of the Mitchell River (North Queensland).

The root of this tree has a bitter taste, and is used by Hindoo practitioners on account of its aperient and cooling qualities. The seeds and bark are also used in native medicine; the latter is of a reddish colour, and is said to possess properties allied to the Cinchonas. The pulverised fruit is used as snuff, and, combined with other remedies, is applied externally in diseases of the skin. (*Treasury of Botany.*)

Queensland.

21. **Barringtonia speciosa,** *Linn. f.*, (Syn., *B. butonica*, Forst.; *Mammee americana*, Linn.; *Mitraria commersonia*, Gmel.; *Butonica speciosa*, Lam.; *B. splendida*, Sol.); N.O., Myrtaceæ; B.Fl. iii., 288.

"Mammee Apple" of Central America.

The clove-shaped calyces are used, as well as the juice of the fresh bark, with honey, as a demulcent in coughs and colds. (Dymock.)

Queensland and Northern Australia.

29. **Cassia Absus,** *Linn.*, N.O., Leguminosæ, B.Fl., ii., 290.

The seeds of this plant, which also grows in Egypt and India, are bitter, aromatic, and slightly mucilaginous. They are used in Egypt as a remedy for ophthalmia. (*Treasury of Botany.*) For this purpose the grains are reduced to fine powder, and a small portion, a grain or more, introduced under the eyelid. It was tried with success in an epidemic of purulent ophthalmia which visited Brussels in 1822. (*Pharm. of India.*)

It is a remedy which should be used with caution.

Queensland and Northern Australia.

30. **Cassytha filiformis,** *Linn.*, (Syn. *C. guineensis*, Schum.); N.O., Laurineæ, B.Fl., v., 311.

"Dodder-Laurel." "Devil's Guts."

The whole plant pulverised, and mixed with dry ginger and butter, is used in the cleaning of inveterate ulcers in India. The juice of the plant, mixed with sugar, is occasionally applied to inflamed eyes. (Rheede.) It is used in native practice as an alterative in bilious affections, and for piles. (Dymock.)

Queensland and Northern Australia.

31. **Casuarina equisetifolia,** *Forst.*, (Syn. *C. muricata*, Roxb.); N.O., Casuarineæ, B.Fl., vi., 197.

"Forest Oak." "Bull Oak." "Swamp Oak." "Wunna-wunna-rumpa" of some Queensland aboriginals.

The bark, according to Dr. Gibson, is an excellent astringent, and may be used with advantage in chronic diarrhœa and dysentery. It is not used medicinally by the natives of India. The Chinese in Bombay say that it is used as an astringent in China. (Dymock.) Doubtless the barks of the numerous other Australian species possess similar properties.

New South Wales, Queensland and Northern Australia.

32. **Cedrela Toona,** *Roxb.* (Syn., *C. australis,* F.v.M.); N.O., Meliaceæ, B.Fl. i., 387; *C. australis* in Muell., Cens., p. 9.

Ordinary "Cedar." For aboriginal names, see "Timbers."

This tree is also a native of India, and its bark has been found valuable in fevers, dysentery, &c. *(Treasury of Botany.)* It is astringent, and in India has been considered a reliable antiperiodic, and by Dr. Newton a good substitute for cinchona. *(Pharm. of India.)* The flowers are considered emmenagogue. (Dymock.)

New South Wales and Queensland.

33. **Cerbera Odollam,** *Linn.* (Syn. *C. Manghas,* Bot. Mag.); N.O., Apocyneæ, B.Fl. iv., 306.

This tree is also a native of Malabar, and while the fleshy drupe, according to Lindley, is innocuous, the nut in the interior is narcotic, and even poisonous. The bark is purgative; the unripe fruit, moreover, is dangerous, and is said to be used by the natives of Travancore to destroy dogs; the teeth of the unfortunate animals being, as is reported, loosened so as to fall out after masticating it. *(Treasury of Botany.)*

Waring *(Pharm. of India)* deprecates the use of the milky juice and leaves of this plant as emetics and purgatives, on the ground that they are dangerous, and that there are numbers of safe and efficient drugs for these purposes.

In Java the leaves are used as a substitute for senna. (Drury.)

Queensland and Northern Australia.

34. **Chionanthus picrophloia,** *F.v.M.,* (Syn. *Mayepea picrophloia,* F.v.M.); N.O., Jasmineæ, B.Fl. iv., 301; *Mayepea picrophloia* in Muell., Cens. p. 92.

The intensely bitter bark of this tree may be administered in intermittent fevers.

Queensland.

35. **Cinnamomum Tamala,** *Th. Nees* (Syn. *C. Laubatii,* F.v.M.; *C. albiflorum,* Nees; *C. Cassia,* Blume; *Laurus Tamala,* Hamilt.; *L. Cassia,* Roxb.; N.O., Laurineæ, B.Fl. v., 303.

"Cassia Cinnamon."

The bark has a persistently bitter taste, due to the presence of an alkaloid which crystallises from its solution in stellate masses of acicular crystals. When administered to warm-blooded animals the alkaloid produced difficulty of respiration, ending in asphyxical difficulty and death. It also had a poisonous action on cold-blooded animals belonging to the reptilia. (Bancroft, in *Australian Journ. of Pharm.*, 1887.)

New South Wales and Queensland.

43. **Cucumis trigonus,** *Roxb.*, (Syn. *C. pubescens*, Hook.; *C. jucundus*, F.v.M.; *C. picrocarpus*, F.v.M.); N.O., Cucurbitaceæ, B.Fl., iii., 317.

This is an aboriginal food (see "Foods"), but I am unaware of its use in the colonies as a medicine.

"The fruit is of the size and shape of a small egg, and marked with green and yellow streaks, like colocynth. It is very bitter, and at the feast of the Diwali, or New Year of the Hindus, is brought to market for sale. The Hindus of Bombay have a custom at this season of breaking the fruit under the foot and then touching the tongue and forehead with it, with the idea that having tasted bitter of their own accord, they may hope for preservation from misfortune during the year. It is not eaten, but is used medicinally in the same way that *Citrullus amarus* is used in Sind." (Dymock, *Materia Medica of Western India.*)

New South Wales, Queensland, Northern and Western Australia.

44. **Cymbonotus Lawsonianus,** *Gaud.*, N.O.. Compositæ, B.Fl., iii., 674.

In the southern parts of New South Wales the country people prepare a salve, used for wounds, &c., by extracting the medicinal properties of this plant by means of melted lard. Alternate layers of lard and leaves are made, the mass is allowed to cool slowly, and afterwards the lard is run out and is ready for use. Some country folk are loud in their praises of its quick healing effects. Mr. Bäuerlen tells me they copied this use of the plant from the Chinese. Although this humble plant is found in all

the colonies, it does not extend to China, so the Chinese probably first used it in an empirical manner.

All the colonies.

45. **Cynometra ramiflora,** *Linn.*, var **bijuga,** (Syn. *C. bijuga,* Spanoghe); N.O., Leguminosæ, B.Fl., ii, 296.

The root is purgative. In India a lotion is made from the leaves boiled in cow's milk, which, mixed with honey, is applied externally in scabies, leprosy, and other cutaneous diseases. (Rheede.)

Queensland.

46. **Daphnandra micrantha,** *Benth.*, (Syn. *Atherosperma micranthum,* Tul.); N.O., Monimiaceæ, B.Fl., v., 285.

"Light Yellow-wood." "Satin-wood."

The bark of this tree is intensely bitter, and is in much repute as a tonic amongst sawyers. (Hill.) Dr. Bancroft has quite recently drawn attention to the properties of this bark, which are similar to those of *D. repandula* (q.v.).

New South Wales and Queensland.

47. **Daphnandra repandula,** *F.v.M.*, N.O., Monimiaceæ, Muell. Cens., p. 3.

The bark of this tree has a transient bitter taste, and when first removed from the tree it has a yellow colour on the inner surface, which changes to a metallic black on exposure to the air, but becomes yellow again when dry. Infusions of the bark are of a yellow colour, and remain free from microscopic organisms when kept. The extract of the bark does not appear to contain either gum or resin, but is rich in alkaloids. The extract is very poisonous, one grain being a fatal dose for a frog, and ten for warm-blooded animals. The alkaloids contained in the bark are colourless when pure and crystalline. The active one is easily separated from the others, being soluble in water. Its poisonous action is chiefly due to its action on the heart. To some extent it is antagonistic to strychnia. The poison powerfully affects fish, molluscs, and infusoria. When applied topically to voluntary or

involuntary muscles it paralyses them rapidly. It also retards the development of septic organisms, and will deodorise putrid meat. It checks the growth of grass, and will kill some water plants. (Dr. Bancroft, in *Australian Journ. of Pharm.*, 1887, 104, and *Proc. R.S., N.S.W.*, 1886, p. 69.)

Queensland.

48. **Doryphora sassafras,** *Endl.*, N.O., Monimiaceæ, B.Fl., v., 283.

"Sassafras."

The bark is used as a tonic medicine. It is taken in the form of an infusion.

New South Wales.

49. **Derris uliginosa,** *Benth.*, (Syn. *Pongamia uliginosa*, DC.; *P. religiosa*, Wight); N.O., Leguminosæ, B.Fl., ii., 272.

The leaves are pounded and thrown into water, for the purpose of stupefying fish, by the natives of many tropical countries.

Queensland and Northern Australia.

50. **Drimys aromatica,** *F.v.M.*, (Syn. *Tasmannia aromatica*, R.Br.); N.O., Magnoliaceæ, B.Fl., i., 49.

"Pepper Tree."

This tree possesses aromatic properties, particularly in the bark, which so closely resembles the Winter's Bark of the Straits of Magellan *(Drimys Winteri)*, that it is said to be sometimes substituted for it.

Tasmania, Victoria and New South Wales.

51. **Duboisia Hopwoodii,** *F.v.M.*, (Syn. *Anthocercis ? Hopwoodii*, F.v.M.); N.O., Solaneæ, (Scrophularineæ in B.Fl.); B.Fl., iv., 480. *D. Hopwoodii* in Muell. Cens., and that name has been followed in this instance.

"Pituri;" spelt also "Pitchiri," "Pitchery," "Pedgery," "Bedgery."

This is the masticatory of the aboriginals of Central Australia, corresponding in this respect to the "Coca" of Peru, the Betel nut of the Eastern Archipelago, the "Taezi Kaat" (*Catha edulis*) of Arabia, &c. The drug is in the form of leaves, more or less

powdered, mixed with finely broken twigs, forming altogether a brown herb. So fine is the powder, and so irritating, that the most careful examination of a specimen is attended with sneezing. The plant is, as far as known, extremely patchy in distribution, and the blacks prize it so highly that they travel enormous distances to procure it; besides, it is a most valuable commodity for tribal barter. They gather the tops and leaves during the month of August, when the plant is in blossom, and hang them up to dry. They are sometimes sweated beneath a layer of fine sand, dried, roughly powdered, and then packed in netted bags, skins, &c., for transport. I have examined perhaps a dozen packages of Pituri at different times, and they have all been made of netted work or canvas. Every bag appeared to be precisely the same both in size, pattern and material. The material I believe to be obtained by the aborigines from gunny-bags or wool-packs; these are unpicked, woven into circular mats about six inches in diameter and folded over the contained Pituri like a jam-tart. The bag is then sewn up with fibre of the same material.* Two of these bags now in the Technological Museum were obtained, the one from Mount Margaret station, Wilson River, south-west Queensland, to which place it had been brought by the blacks from the Herbert River; the other also from the Herbert River, lat. 23° S., long. 139° E., near the Pituri Creek. In neither case can more precise localities of the place from which the Pituri was procured be obtained, perhaps partly because the blacks do not wish the locality to become generally known, and partly because the packages have passed through so many hands.

Sometimes pituri is chewed in company, a quid being passed round from one native to another, and when they have had sufficient, one politely plasters it behind his ear. It is also smoked, and to prepare the leaves for this purpose they are damped, mixed with potash prepared from the ashes of suitable plants, and rolled

* In the South Australian Museum the following pituri bags (amongst others) may be seen :—

1. Skin of small animal, with the flesh-side outwards.
2. Bag of blue and red stripes, probably of European yarn.
3. A bag with red stripes, and stripes of the usual unbleached fibre.

up in the shape of a cigar. This is often chewed, and the saliva swallowed. In small quantities it has a powerful stimulating effect, assuaging hunger, and enabling long journeys to be made without fatigue, and with but little food. It is also used by the aboriginals to excite them before fighting. It is used to poison emus.

Wills' diary from Cooper's Creek (p. 283) has the following, under date May 7th, 1861 :—

"In the evening, various members of the tribe came down with lumps of nardoo and handfuls of fish, until we were positively unable to eat any more. They also gave us some stuff they call "bedgery" or "pedgery;" it has a highly intoxicating effect when chewed even in small quantities. It appears to be the dried stems and leaves of some shrub."

"The pituri consists of leaves broken into small particles and mixed with acacia leaves, small dried berries containing reniform seeds, and unexpanded flower-buds of the shape of a minute caper." (These surmises are, of course, not correct.)

In March, 1872, Dr. Bancroft, of Brisbane, read a paper before the Queensland Philosophical Society on "Pituri." He obtained specimens from a Mr. Gilmour, who had procured them from the neighbourhood of the Kulloo water-hole, eight miles beyond Eyre's Creek. He stated that the use of the pituri is confined to the men of a tribe called Mallutha, all the males of which are circumcised. The pituri caused a severe headache in Europeans who used it.

Dr. Bancroft thus describes the effect of an infusion of pituri :—

1. Period of preliminary excitement from apparent loss of inhibitory power of the cerebrum, attended with rapid respiration; in cats and dogs, with vomiting and profuse secretion of saliva.
2. Irregular muscular action, followed by general convulsions.
3. Paralysis of respiratory function of medulla.
4. Death, or
5. Sighing inspirations at long intervals.
6. Rapid respiration and returning consciousness.

7. Normal respiration and general torpidity, not unattended with danger to life.

The poison given by the mouth acts with less vigour; when it is injected into the intestines the results are more certain. The animal has a longer stage of excitement, the convulsive fit is not so severe, and recovery is more certain. Torpidity remains for some hours.

A quarter of a drop injected under the skin of a rat causes excitement; the animal starts with slight noises, may fall over a few times from very strong muscular irregularities; remains excitable for some time, then gradually becomes torpid.

In small medical doses we may expect to find the period of the excitement and the torpidity to be the only marked symptoms. In cats and dogs the excitement is not marked, but vomiting of a violent kind occurs.

Dr. George Bennett, of Sydney, has some notes on the drug in the *N.S.W. Medical Gazette*, iii., 8, May, 1873. His pituri was obtained from the same source as that used by Dr. Bancroft, but was in a damaged condition.

In September, 1878, Mr. A. W. Gerrard experimented with a very small quantity (30 grains) of pituri, which had come into his possession. He found an alkaloid, to which he gave the provisional name of "pituria," but on account of the smallness of material available, he was unable to describe its properties with much definiteness. (See *Pharm. Journ.*, [3], ix., 251.) *Loc. cit.* p. 638, will be found a chatty account of pituri, taken from the *Lancet*, to which it was sent by Mr. J. G. Murray, surgeon to a Central Australian exploring expedition.

Mr. A. Petit having obtained a quantity of pituri, repeated and supplemented Mr. Gerrard's experiments. (See a paper in the *Pharm. Journ.* [3], ix., 819.) He pronounces the alkaloid contained in the substance to be nicotine, and quotes some physiological experiments by Professors Sydney Ringer and Murrell as supporting his view.

On 3rd November, 1880, Professor Liversidge, of the Sydney University, read a paper before the Royal Society of New South

Wales on the subject. Professor Liversidge had more material at his disposal than had previous observers; moreover, his research is probably the most exhaustive that has ever been made on the subject. The paper (*Proc. R.S., N.S.W.*, 1880, 123) scarcely bears abstracting. Professor Liversidge isolated a brown, liquid, acrid alkaloid, distinct from nicotine, which he calls *piturine*.

Interior of all the colonies except Tasmania and Victoria; in other words, from the Darling and Barcoo Rivers to Western Australia.

52. **Duboisia myoporoides,** *R.Br.*, (Syn. *Notelæa ligustrina*, Sieb.); N.O., Solaneæ (Scrophularineæ in B.Fl.); B.Fl., iv., 474.

Called "Corkwood" and "Elm" by the colonists, and "Orungurabie" by the aboriginals of the Clarence River, New South Wales. "Ngmoo" is another aboriginal name.

The first important statement as to the narcotic effect of this plant I can find is recorded by the Rev. Dr. Woolls, from a correspondent of his. "It has an intoxicating property. The aborigines make holes in the trunk and put some fluid in them, which, when drunk on the following morning, produces stupor. Branches of this shrub are thrown into pools for the purpose of intoxicating the eels and bringing them to the surface. I have known an instance in which giddiness and nausea have arisen from remaining in a close room where branches of it have been placed." The smell is faint and sickly, but with nothing like the intensity of *D. Hopwoodii*.

Dr. Bancroft, of Brisbane, obtained an extract from the plant, which he found useful in ophthalmic surgery, and he introduced it to the medical world.

The leaves owe their active properties to the presence in them of an alkaloid called *duboisine*, which Ladenberg pronounces identical with *hyoscamine*, albeit there are minute differences between them. The method adopted by Mueller and Rummel to obtain the alkaloid, and a short account of the latest researches of Ladenberg in regard to its position, are given herewith. (See also Liversidge, *Proc. R.S., N.S.W.*, 1880, 125.)

Duboisine is a volatile alkaloid of the leaves and twigs of *Duboisia myoporoides*, R.Br., and probably identical with the *piturine* found by Staiger in *Duboisia Hopwoodii*, F.v.M. Prepared like nicotine. It is a yellowish, oily liquid, lighter than water, of a strong narcotic odour, resembling that of nicotine, and also cantharides, of a very strong alkaline reaction ; neutralises acids completely ; dissolves in any quantity of water, alcohol, and ether ; throws down ferrous oxide from ferrous sulphate ; dissolves concentrated acids, forming a colourless solution. Its hydrochloride in a weak, aqueous solution, is precipitable by biniodide of potassium, the iodides of potassio-mercury, and of potassio-bismuth, and by tannic acid, not by other alkaloid reagents. Nicotine, which *duboisine* resembles, is distinguished from the latter by its specific gravity, its less-powerful odour, and by its hydrochloride in a diluted aqueous solution being precipitated by phosphomolybdate of soda, picric acid, and chloride of platinum. (Mueller and Rummel, in Wittstein's *Organic Constituents of Plants.)*

About seven years ago, Professor Ladenberg, during his investigation of the mydriatic alkaloids, arrived at the conclusion that duboisine, the base obtained from the Australian *Duboisia myoporoides*, was identical with hyoscyamine (*Pharm. Journ.* [3], xi., 351), though as generally met with probably contaminated with some impurity. This opinion was subsequently challenged by Herr Harnack, who affirmed that duboisine exercised a much stronger physiological action than hyoscyamine. Professor Ladenberg has, therefore, been induced to re-investigate the subject, working upon a sample of duboisine supplied by Herr Merck. The base, as received, was a yellow-brown, syrupy mass, which was dissolved in hydrochloric acid, and precipitated with gold chloride. The gold salt had at first a resinous appearance, but after four recrystallizations, it became homogenous, melting constantly at 197° to 198°, and showing all the properties, and having the same elementary composition as the gold salt of hyoscine. Neither hyoscyamine nor any other alkaloid could be detected in the first mother-liquor from the gold salt. Professor Ladenberg is of opinion that the explanation of this different result probably lies in

some variation in the method of preparing the duboisine, but confesses he cannot say in what respect. It will be remembered that the name "hyoscine" was appropriated for a base found in the mother-liquor, after the removal of hyoscyamine, in preparing that alkaloid from henbane; it is isomeric with atropine and hyoscyamine, but is split up by alkalies into tropic acid and pseudotropine. (*Pharm. Journ.*, 25th June, 1887.)

For an account of Gerrard's experiments with the alkaloid of this plant, together with some physiological experiments with it (Vide *Pharm. Journ.* [3], viii., 787, et seq.)

In practice, the sulphate of the alkaloid, which forms golden yellow scales, is usually preferred. The dose is from $\frac{1}{120}$ to $\frac{1}{30}$ of a grain.

The extract is said to have been given with great benefit in cases of the night sweats of phthisis, without producing any bad effects on the appetite. It produced entire relief from pain in a severe case of vesical tenesmus from inflammation of the urethra and neck of the bladder.

The following references to the alkaloid are taken from Martindale and Westcott's *Extra Pharmacopœia*. It dilates the pupil, dries the mouth, checks perspiration, causes headache and drowsiness, antagonises muscarine. On the eye it acts more promptly than atropine. (*Lancet*, i., 1878, 304.)

Eight cases of toxic symptoms, giddiness, delirium and dryness of the mouth, from use of eye drops, four grains to the ounce. (*Lancet*, ii., 1879, 353.)

As a mydriatic it is much stronger than atropine. Its use requires care—it is apt to produce giddiness, etc., and even delirium. (*Lancet*, ii., 1879, 441.)

Its action relative to atropine, physiologically, etc. (*Practitioner*, xxiii., 246.)

Therapeutic and physiological effects, differs from atropine by the persistence and greater rapidity of its action on the muscle of accommodation; is a useful calmative in maniacal delirium; as a sedative ointment, one in five hundred of vaseline applied night and morning is useful in inflammation of the cornea. (*Prac.*, xxv., 294.)

In exophthalmic goitre, $\frac{1}{150}$ grain, two or three times a day gives great relief. (*B.M.J.*, i., 1883, 958.)

Résumé of its physiological properties. (*Lancet*, ii., 1881, 806. *British Medical Journal*, ii., 1879, 362, ii., 1881, 529. *Trans. Med. Congress*, 1881, i., 511.)

53. **Elephantopus scaber,** *Linn.*, N.O., Compositæ, B.Fl., iii., 461.

The leaves of this plant are used in Travancore, boiled and mixed with rice, for pains in the stomach, and swellings in the body. (*Treasury of Botany.*)

Queensland and Northern Australia.

54. **Entada scandens,** *Benth.*, (Syn. *E. Pursætha*, DC.; *Mimosa scandens*, Linn.); N.O., Leguminosæ, B.Fl., ii., 298. *E. Pursætha* in Muell. Cens., p. 43.

"Queensland Bean." "Leichhardt Bean."

The properties of the seeds do not appear to have been tested in European practice; among the natives of India they have the reputation of being emetic. An infusion of the spongy fibres of the trunk is used with advantage for various affections of the skin in the Philippines. (Dymock, *Materia Medica of Western India.*)

Queensland.

55. **Epilobium tetragonum,** *Linn.*, N.O., Onagreæ, B.Fl., iii., 305.

The Rev. Dr. Woolls mentions that this small swamp plant is used in rustic medicine in certain urinary disorders.

All the colonies.

56. **Erythræa australis,** *R.Br.*, N.O., Gentianeæ, B.Fl., iv., 371.

"Native Centaury."

This plant is useful as a tonic medicine, especially in diarrhœa and dysentery. The whole plant is used and is pleasantly bitter. It is common enough in grass-land, and appears to be increasing in popularity as a domestic remedy.

All the colonies.

57. **Erythrina indica,** *Lam.*, N.O., Leguminosæ, B.Fl., ii., 253.

"Coral Tree" (of India).

Wight states that the leaves and bark are used as a febrifuge. Kanni Loll Dey, in a communication in the Calcutta Exhibition Catalogue, says:—" It is anthelmintic and useful as a collyrium (*i.e.*, eye-salve or eye-wash) in ophthalmia. The leaves are applied externally to disperse venereal buboes and to relieve pain in the joints." In the Concan, the juice of the young leaves is used to kill worms in sores, and the young roots of the white-flowered variety are pounded and given with cold milk as an aphrodisiac. (Dymock, *Materia Medica of Western India.*)

Queensland and Northern Australia.

58. **Erythroxylon australe,** *F.v.M.*, N.O., Lineæ., B.Fl., i., 284. *Erythroxlyum* in Muell. Cens.

Mr. Staiger finds that the leaves do not contain cocaine (the well-known alkaloid of *E. Coca*), but they contain coca-tannic acid.

Queensland.

59. **Eucalyptus spp,** N.O., Myrtaceæ.

It is very difficult to trace to individual species the properties ascribed to the genus Eucalyptus. Eucalyptus is a name very loosely used by many people, who forget that it comprises (Baron Mueller's census) no less than 134 species, while a fresh one is occasionally discovered, and some of these have varieties so well marked as to be classed as distinct species by some authors. It should not be lost sight of that in this vast genus the properties of different species are frequently very different, so that to describe a product as simply "Eucalyptus" is but a bald description, and one likely to lead to great confusion. There is some excuse for this, however, as Eucalyptus products have only been brought under notice during the past quarter of a century, and some allowance must be made to outsiders in respect to their references to a genus so imperfectly known to Australians themselves. The leaves and flowers are usually far removed from the ground (especially the flowers), and some apparatus not usually possessed by pedestrians must be used to obtain the latter. They are, therefore, comparatively unfamiliar; this is doubtless partly the reason why they are not better known.

Eucalypts contain a *volatile oil*, varying in composition in some species, and of a somewhat complex nature (see "Oils"), a *bitter or tonic principle*, in an amorphous condition, and strongly hygroscopic, and a *kino*.

The following species may perhaps be considered the chief medicinal species:—

For volatile oil—*E. amygdalina*, *E. oleosa*, *E. globulus*.

For bitter principle—*E. rostrata*, *E. globulus*.

For kino—*E. rostrata*, *E. calophylla*, *E. corymbosa*, *E. maculata*, *E. tesselaris*, *E. siderophloia*, *E. amygdalina*, *E. piperita*.

It was formerly imagined by some that Eucalyptus leaves contain *quinia* or some other of the well-known alkaloids of Cinchona barks. But the experiments of Broughton, the Government quinologist, Ootacamund, India, entirely disprove this; for upon careful examination of the bark and leaves, this chemist states that neither *quinia* nor any of the other alkaloids of Cinchona barks, as *quinidia*, *cinchonia*, or *cinchonidia*, exist in the plant in any proportion. The properties of the leaves, therefore, so far as is known at present, depend essentially upon the volatile oil. (Bentley and Trimen, *Medicinal Plants*, 109.)

The latter statement is hardly correct, as they owe some of their principles to the bitter principle already referred to.

The juice of Eucalyptus leaves of various species has been tried as a stimulant for the growth of the hair, much in the same way as rue is used, but although the remedy certainly can do no harm, the cases in which good has been reported to have ensued are not so well authenticated as one could wish.

Mr. Baker (United States Consul at Buenos Ayres, where several Eucalypts have been largely introduced), reports that the people there bruise the leaves of *E. globulus* and bind them to the forehead in nervous headache.

The leaves of *E. globulus* and other species possess febrifugal properties to some extent, and Mr. Bosisto has prepared a "*Liquor Euc. globuli*," which is sold as a fever and ague remedy. It is said to counteract malaria without exciting the prejudicial effects of quinine on the nervous system. It is also used as a general tonic.

In the *Aust. Journ. of Pharm.* for May, 1887, occurs the statement that a miner at Kimberley, Western Australia, cured himself of scurvy by making a decoction of the leaves of a "White Gum." What species of Eucalyptus is alluded to I cannot guess at.

The dose of Eucalyptus leaves is given in Martindale and Westcott's *Extra Pharmacopœia* at five grains or more, in powder. When coarsely powdered, they are employed for smoking in cigarettes in cardiac and aneurismal asthma.

The following references are obtained from the same source: History of the drug, its uses and botanical origin. Is a febrifuge; the leaves are also employed as a healing application to wounds. (*Medical Times and Gazette*, i., 1874, 540. *Pharm. Journ.* 1874, 872; 1879, 865.) Ague, rapid cure of, by one to two drachm doses of the tincture. (*Practitioner* xviii., 366.)

In ozœna, bronchitis with profuse foul expectoration, and uterine catarrh, tincture and infusion used both internally and externally (*Pr.* xx., 206).

Tincture used in intermittent fever (*Pr.* xx., 411; xxiv., 138).

Use of steam from the infusion of leaves in infectious diseases, especially diphtheria (*Lancet*, i., 1883, 316).

A correspondent writes to the *Town and Country Journal*, Sydney, that there is a remedy for the ills of the poultry yard always at hand in the gum trees around it. He says:—"For diarrhœa, dysentery, and cholera in fowls, get a quantity of Eucalyptus leaves (white or blue gum; I have used both), dry the leaves sufficiently to make them brittle, crush, and make into pills with the aid of a little bread or dough. Put as much of the powder (*i.e.*, crushed or powdered leaves) as you can lift with a shilling into each pill. Give one to each fowl affected, and if necessary repeat the dose next day. I have not had a single death among my fowls since I used the foregoing remedy. I lost seventeen in two days with cholera, and the four I saved out of the twenty-one I had could not stand when I gave them the pills. They are now fine healthy birds. I have recommended the remedy to several people, and in no case has there been a single failure. I lost at the same time a collection of Australian parrots

from the same complaint, and it was by observing a flock of parrots on a white gum tree that I found out the remedy. I have not lost a single parrot since. I give any parrot ailing a little powdered leaf in a tube, inserting one end into the throat of the bird, and blowing the powder into it. Put a few leaves into the cage for them to eat. Finally, I may add that I have taken a large pill, composed of the blue gum, for a very severe attack of dysentery, which proved effectual, and the best remedy I have ever used. I have been a severe sufferer. I think the Eucalyptus is nature's remedy for the foregoing complaints, and is worth trying."

* In France, five different Eucalyptus preparations are in use.

1. A tincture made by an alcoholic maceration of the fresh leaves.
2. A tincture obtained from the dry leaves by the same process.
3. An alcoholic extract.
4. A wine.
5. A liniment prepared from the essence *(sic)*.

"It is interesting to note that the preparations used in Italy against the marsh fevers in Rome and its vicinity all come from a place called Tre-Fontane, and have the form of a highly concentrated ethereal extract, and an alcoholic elixir." (See *E. globulus*, "Timbers.")

"If a few drops of an Eucalyptus preparation are placed on the tongue, a sensation of pungent freshness, soon followed by one of warmth, is experienced, the latter being due to a hyper-secretion of the salivary and buccal glands. Its ingestion into the stomach creates a similar sensation of warmth, and, besides, an emission of its characteristic odour by the mouth. The urine reveals a faintly violet colouration, indicating the passage of the drug through the system. . . . Larger doses of the drug produce headache, malaise, general fatigue and prostration, and even, as shown by Gimpert, fatal results in animals, by paralysing the reflex motor centres of the spinal cord." *(La France Medicale*, Nos. 43-5, 1885, quoted in *Therapeutic Gazette*. (See also "Oils.")

* Some of these preparations were actually on sale at the recent Adelaide Jubilee International Exhibition. This is taking coals to Newcastle with a vengeance.

"An honourable and noteworthy rank as an auxiliary remedy in miasmatic fevers is all that can be claimed for the preparations of Eucalyptus. The statement that Eucalyptus asserts its antipyretic character also in the thermal elevations of tuberculosis and cancer appears, if true, to us all the more noteworthy, as its virtues in this direction have been most generally overlooked.

"Important as the antimiasmatic and general antipyretic properties of Eucalyptus unquestionably are, it is in the laryngeal and bronchial inflammatory affections that the drug renders its most signal service. Its action in this respect rivals turpentine and tar, and offers even advantages in being better borne by the digestive organs, and being easier administrable.

"Dr. Gimpert, of Cannes, the celebrated consumptive specialist, believes it to be of benefit in tubercular disease, but warns, however, against exhibiting the drug in too large doses, lest hæmoptysis should set in." (*La France Medicale*, *loc. cit.*)

The value of Eucalyptus oil in the various catarrhal affections of the urino-genital apparatus is likewise great.

Dr. Owen reports in the *Australian Medical Journal* of 15th September, 1885, the case of a child, 17 months old, which was poisoned by drinking a few drops of Eucalyptus extract out of a supposed empty bottle. The symptoms were alarming, but the patient recovered under proper treatment.

Throughout the colonies.

Planting of Eucalyptus Forests.

(*See also* "Timbers.")

Monsieur Ramel is to be credited with having first suggested the idea of planting Eucalyptus trees in Europe, with the view of thus ridding territory from baneful marsh and malarial fevers. The same object led to its cultivation at the Cape. It was this ingenious transplantation of species of this genus to the vicinity of Rome, that enabled the Trappists of Tre-Fontane to recover and render habitable a vast area formerly exposed to the ravages of malaria. It is highly probable that the disinfectant power of the tree depends largely upon its capacity of absorbing large

quantities of water from the surrounding soil, and of thus dessicating the germs of malaria. Baron Mueller's services in forwarding seeds of *Eucalyptus globulus* and other species to the Trappist Fathers of Tre-Fontane (through the late Archbishop Gould, of Melbourne), must not be forgotten.

"We have as yet no accurate pathologic data on the effect of the exhalation of Eucalyptus forests on phthisic patients; but I anticipate, that in the same manner as the air of dense pine-woods is apt to stay the inflammatory processes in diseases of the respiratory organs, so the vapours of our Eucalyptus forests, the odour of which we so easily perceive and recognize, will likewise arrest the progress of these sad diseases, more particularly in their earlier stages, and probably more so than sea-air, notwithstanding its pureness, the atoms of bromine and iodine carried with it, and the increased ozone which it evolves. Indeed, I should assume that sanitarian dwellings could nowhere on the whole earth be provided for phthisic patients more auspiciously and more hopefully than in mountains clothed with Eucalyptus forests in extra tropical Australia, and at elevations (varying according to latitude from 1000 to 3000 feet), where the slightly rarified air of a very moderate humidity pervaded by Eucalyptus vapour, together with the comparative equability of the temperature, would ease the respiration greatly. This assumption is largely based on the facts that no other gregarious trees in the world evolve essential oil so largely as our Eucalypts, unless, perhaps, some of the most terebinthine pines of colder climes, and that thus is most copiously afforded an oily volatile emanation, befitted to absorb and condense oxygen into ozone, the most powerful vitalizing, oxidizing, and, therefore, also, chemically and therapeutically disinfecting element in nature's whole range over the globe." (Baron von Mueller in *Eucalyptographia.)*

It is but right to quote testimony on the other side of the question. Speaking of *E. crebra*, the Rev. J. E. Tenison-Woods states (*Proc. Linn. Soc.*, *N.S.W.*, 1882, 336): "On the Peak Downs, about Clermont and Copperfield, it is especially plentiful, and all around the Hodgkinson diggings. I mention this fact just to show that whatever febrifuge qualities the Eucalypts may possess,

the mere presence of some species will not be enough to dissipate malaria. In the places I have mentioned fever and ague were common enough, yet the prevailing winds used to blow through hundreds of miles of these gum trees ere they reached the infected localities." (See also "Oils and Oil-seeds.")

60. **Eugenia jambolana,** *Lam.* (Syn, *E. Moorei*, F.v.M.; *Syzygium jambolanum*, DC.; N.O., Myrtaceæ, B.Fl. iii., 283; *E. Moorei* in Muell., Cens. p. 59.

"Durobbi" of some aboriginals.

A vinegar prepared from the juice of the ripe fruit is an agreeable stomachic and carminative; it is also used as a diuretic in India. The bark is a useful astringent. The expressed juice of the leaves enters into Indian medicine in various ways. The seeds are said to be a powerful remedy in diabetes, but their true value has not yet been assigned.

New South Wales and Queensland.

61. **Euphorbia spp.,** N.O., Euphorbiaceæ.

It is stated that the natives of Northern Territory use the juice of a species of Euphorbia as a specific in smallpox.

Another species affords a juice said to be a remedy in cancer. Without committing oneself to an expression of opinion as to the utility of the Euphorbias alluded to, our native species will doubtless well repay a thorough examination of their medical properties.

Throughout the colonies.

62. **Euphorbia alsinæflora,** *Baill.*; N.O., Euphorbiaceæ, B.Fl. vi., 49.

This herb is used in infusion by bushmen in cases of chronic dysentery and low fever. (Bailey.)

Northern Australia.

63. **Euphorbia Drummondii,** *Boiss.*; N.O., Euphorbiaceæ, B.Fl. vi., 49.

Called "Caustic Creeper" in Queensland, and "Milk Plant" and "Pox Plant" about Bourke, New South Wales.

An alkaloid called *drumine* has been extracted in Australia from this plant. It is said to have the same local action as cocaine,

but more extended experience will be necessary before its true value can be assigned.

Since the above was written the so-called alkaloid has been examined in England, and found to consist mainly of calcium oxalate! *(Pharm. Journ., 7th Jan., 1888.)* No explanation has, up to the present, been submitted in explantion of what is either crass ignorance or trifling.

Some people contend that this plant contains no poisonous principle, yet cases of poisoning (chiefly of animals) seem without any doubt to have been traced to this particular plant. But perhaps its virulence only exists at a certain stage of its growth.

In Western New South Wales the aboriginals use an infusion or decoction of the plant in genital diseases, and use rather strong doses, but it is said that an overdose simply causes headache. Mr. P. A. O'Shanesy observes that this plant is said to be an infallible remedy for dysentery and low fever.

Throughout the colonies.

64. **Euphorbia pilulifera,** *Linn.*, (Syn. *E. hirta*, Linn.; *E. capitata*, Lam.; *E. globulifera*, Kunth; *E. verticillata*, Vellox); N.O., Euphorbiaceæ, B.Fl., vi., 51.

"Asthma Herb," or "Queensland Asthma Herb."

This plant having obtained some reputation in Australia in certain pulmonary complaints, has acquired the appellation in the colonies of "Queensland Asthma Herb." Nevertheless, it is by no means endemic in Australia, for it is a common tropical weed. Bentham gives the following places where it abounds:—All tropical America, from Florida and New Mexico to Brazil and Peru; tropical Africa, from the western coast to Mozambique; Mauritius, East Indies, South Sea Islands,* China, Japan, Sandwich Islands, Ceylon, and Queensland, about Rockhampton. (Northern Australia must now be added.)

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* Seemann (*Flora Vitiensis, p.* 217), however, says that this is evidently a comparatively recent introduction to Polynesia, as it was not mentioned or collected by the older botanists. If this be so, doubtless it is an introduction into Australia too. He gives the Fijian name as "Do ni osi" (*i.e.*, horse-dung, from the natives believing that this weed was introduced together with the horse).

It was first introduced to notice by Dr. Carr-Boyd, of Townsville, Queensland, about 1880, as a remedy in asthma, bronchitis, and other diseases of the respiratory organs.

The herb from Fiji is said to be of better quality than that from Queensland, but inasmuch as it is a common weed in many countries, and, moreover, easily cultivated, any demand for it could be readily supplied.

The direction usually given by vendors is to simmer one ounce of the dried herb in two quarts of water, and to reduce the liquid to one quart; a wineglassful of this decoction is to be taken three times a day. If the fame of this drug be maintained, doubtless some enterprising pharmacists will present it to the public in a more elegant form.

The smoke, also, of the herb should be inhaled, either by means of an ordinary tobacco pipe, or by burning it on a slab. In either case, care should be taken to get the smoke well into the lungs.

It is said that alcohol fails to extract the medicinal properties of this plant as efficiently as water.

It is reported to be of service in phthisis, relieving the distressing cough in that disease. Nevertheless, it is not an infallible cure, nor does it always even give relief in cases of asthma. I have known cases in which it has apparently utterly failed. My friend, Dr. Thomas Dixson, lecturer on Materia Medica at the University, Sydney, says that from his own observations the virtues of the plant have been vastly over-rated, and that in reality it is but of little value. Still, many cases have come under my notice in which it has unequivocally given relief, and I have no doubt that when the drug shall have longer stood the test of experience, members of the medical profession will largely record their experience of its use, and it will be assessed at its proper value. At present, as far as I have learnt the opinion of medical men in Sydney on this plant, it is only to be considered as one of the numerous remedies which give more or less temporary relief, and must on no account be regarded as a specific.

A correspondent from Fiji says that some people prefer the herb, as a beverage, to the common China teas. This is, perhaps,

a vague comparison, as the China teas in question may have been very common indeed. "A little euphorbia, mixed with ordinary Congo, gives it quite an Indian flavour." I cannot accept this as a fact, but I give the sentence as embodying the experience of one who professes to have had much to do with the drug.

As it belongs to the notoriously poisonous genus *Euphorbia*, care should be exercised in its administration.

There is an excellent article, entitled "A Contribution to the Study of *Euphorbia pilulifera*," by Dr. A. Marsset of Paris, in *The Therapeutic Gazette* (Detroit, U.S.A.) of February, 1885. It is accompanied by a woodcut of the plant, but a much better picture (a water-colour drawing from a living plant) is exhibited in the Technological Museum.

While acknowledging that the use of the plant in pulmonary complaints is of very recent origin, he gives the following, which shows that its use in medicine is by no means recent. Dr. Marsset says, "Pison (Opera, Amsterdam, 1658) appears to have been the first to have spoken of *Euphorbia pilulifera* from a medical standpoint. After having given an exact but incomplete description of the plant, he adds, that "if chewed or freshly bruised leaves are applied on a snake-bite, they not only assuage the pain, but even remove the venom and heal the wound. A pinch of the dried powder, taken in some convenient menstruum, excites the heart and arouses the vital forces depressed by the poison."

Ainslie, in his "*Materia Medica*" (London, 1826), describes, under the name of "Pill-bearing Spurge," a plant of India and Ceylon, which seems to have been either the *E. pilulifera* of Brazil, or a kindred species with lilac flowers. "The native physicians," he says, "employ the fresh juice as an outward application in aphthous affections."

It is doubtful whether the plant alluded to by Lescourtilz (*Flore Méd. des Antillas*, Paris, 1821), which he calls *E. pilulifera*, and an infusion of which is recommended by him as a "lenitive ptisan in gonorrhœa, be really the botanical species under consideration; his description would, in fact, make it probable that he had in mind another species." . . . The leaves have been compared to those of spearmint and pellitory, but are a little

thicker, and they have an oily savour joined to slight astringency and acidity, not at all disagreeable. If you cut or tear them there issues a little white, thick juice, which is without acridity."

Dr. Marsset then gives, in more or less detail, reports of twelve cases, and adds: "Of the twelve patients who were the subjects of the above reports, eleven suffered from crises of dyspnœa, with or without euphysema and chronic bronchitis. In some the respiratory distress followed pulmonary disease, in others it preceded all other symptoms. All these patients derived the greatest benefit from the Euphorbia; some of them seemed to be radically cured under its use."

I now quote Dr. Marsset's conclusions, and commend the whole of his paper to the consideration of my readers:—

1. The active principle of *E. pilulifera* is soluble in dilute alcohol and water, insoluble, or but little soluble in ether, chloroform, bisulphide of carbon and essence of turpentine.
2. It is toxic in doses to small animals, killing them by arrest of the respiratory movements and cardiac pulsations, which are first accelerated, then slowed.
3. Its effects are not cumulative.
4. It seems to act directly on the respiratory and cardiac centres. It leaves intact the other organs.
5. It seems to be eliminated by the liver.
6. Locally, it is without action on the skin and mucous membranes, except the gastric mucous membrane, which it irritates.
7. It gives good results in attacks of dyspnœa caused by spasmodic asthma, emphysema or chronic bronchitis.

It ought to be employed in daily doses, corresponding at the most to one gramme of the dried plant, and should be taken well diluted with water at meal-time.

These conclusions are based upon reports which are given at fairly full length. Whether the conclusions are fair deductions from the reports is purely one for medical men to decide; as a layman, I do not presume to offer an opinion.

Queensland and Northern Australia.

65. **Evolvulus alsinoides,** *Linn.*, (Syn. *E. linifolius*, Linn.; *E. decumbens*, R.Br.; *E. villosus*, R.Br.; *E. heterophyllus*, Labill.; *E. pilosus*, Roxb.); N.O., Convolvulaceæ, B.Fl., iv., 437. *E. linifolius* in Muell. Cens., p. 95.

The stalk, leaves and roots are a reputed remedy in dysentery and fever. (Ainslie.) This plant is not endemic in Australia.

All the colonies except Victoria and Tasmania.

66. **Excæcaria Agallocha,** *Linn.*, (Syn. *E. affinis*, Endl.; *Commia Cochinchinensis*, Lour.; *Stillingia Agallocha*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 152.

"River Poisonous Tree." "Milky Mangrove." "Blind-your-eyes."

It produces, by incision in the bark, an acrid, milky juice, which is so volatile that no one, however careful, can gather a quarter of a pint without being affected by it. The symptoms are an acrid, burning sensation in the throat, sore eyes, and headache. A single drop falling into the eyes will, it is believed, produce loss of sight. The natives of Eastern Australia, as well as those of New Guinea, etc., use this poisonous juice to cure certain ulcerous chronic diseases, *e.g.*, leprosy, but in Fiji the patient is fumigated with the smoke of the burning wood. (Vide Seemann, *Flora Vitiensis.*) In India the sap of the tree is called "Tiger's Milk," and is said to be applied with good effect to inveterate ulcers. The leaves also are used in decoction for this purpose. A good caoutchouc may be prepared from the milk.

New South Wales to Northern Australia.

67. **Ficus glomerata,** *Roxb.*, (Syn. *F. vesca*, F.v.M.; *Covellia glomerata*, Miq.); N.O., Urticeæ, B.Fl., vi., 178.

"Clustered Fig."

This tree possesses an astringent bark; this, as well as the fruit, which is considered to have similar properties, is prescribed in hœmaturia, menorrhagia, and hæmoptysis. The dose is about 200 grains. The fruit filled with sugar is considered to be very cooling, and the small, blister-like galls which are common on the leaves, soaked in milk and mixed with honey, are given to prevent pitting in smallpox. Ainslie tells us that "from the root of the

tree, which in Tamil is called Attievayr, there exudes, on its being cut, a fluid which is caught in earthen pots, and which the Vytians consider a powerful tonic when drunk for several days together." In Bombay the sap is a popular remedy, which is locally applied to mumps and other inflammatory glandular enlargements, and is used in gonorrhœa. (Dymock, *Materia Medica of Western India.*)

Queensland and Northern Australia.

68. **Flagellaria indica,** *Linn.*, N.O., Liliaceæ, B.Fl., vii., 10.

"Lawyer Vine."

The leaves are said to be astringent and vulnerary. (Bailey.)

This plant is not endemic in Australia.

New South Wales to Northern Australia.

69. **Frenela Endlicheri,** *Parlat.*, N.O., Coniferæ, B.Fl., vi., 238. The *Callitris calcarata* of Muell. Cens., p. 109.

"Cypress Pine." For botanical synonyms, and other vernacular names, see "Timbers."

Mr. Bäuerlen informs me that the twigs of this tree are used in Northern Victoria and Southern New South Wales for mixing with fodder to expel worms in horses. See also *Boronia rhomboidea.*

Northern Victoria to Central Queensland.

70. **Geijera salicifolia,** *Schott.*, N.O., Rutaceæ, B.Fl., i., 364.

"Balsam of Copaiba tree." "Wilga."

The bark contains a powerful bitter, and has the odour of the drug from which it obtains one of its vernacular names.

New South Wales and Queensland.

71. **Goodenia spp.,** N.O., Goodeniaceæ.

A species of *Goodenia* is supposed to be used by the native gins to cause their young children to sleep while on long journeys, but it is not clear which is used, or how it is administered. (Bailey.) Many plants of this natural order contain a tonic bitter which does not seem to have been critically examined.

Throughout the colonies.

72. **Gratiola pedunculata,** *R.Br.*, and **G. peruviana,** *Linn.*, (Syn. *G. pubescens*, R.Br.; *G. latifolia*, R.Br.; *G. glabra*, Walp.); N.O., Scropularineæ, B.Fl., iv., 492-3.

"Brooklime." "Heartsease." "Tangran" of the aboriginals of the Coranderrk Station, Victoria.

A decoction of these plants is used by people in the Braidwood district (New South Wales) for liver complaints with (many say) good results. They enter into domestic medicine for some complaint or other in various parts of the colonies. The latter plant is not endemic in Australia.

All the colonies except Tasmania, *(G. pedunculata;)* all the colonies, (*G. peruviana.*)

73. **Guilandina Bonducella,** *Linn.*, (Syn. *Cæsalpinia Bonducella*, Fleming); N.O., Leguminosæ, B.Fl., ii., 276. *Cæsalpinia Bonducella* in Muell. Cens., p. 42.

The seeds are called "Molucca Beans," or "Bonduc Nuts," and "Nicker Nuts."

The kernels of the nuts are very bitter, and are said by the native doctors of India to be powerfully tonic. They are given in cases of intermittent fevers, mixed with spices in the form of powder. Pounded and mixed with castor-oil they are applied externally in hydrocele. At Amboyna the seeds are considered anthelmintic, and the root tonic in dyspepsia. In Cochin China the leaves are reckoned deobstruent and emmenagogue, and the root astringent. The oil from the former is used in convulsions, palsy, and similar complaints. In Scotland, where they are frequently thrown on the sea shore by the currents, they are known as "Molucca Beans." (Drury.)

Northern New South Wales, Queensland and Northern Australia.

74. **Hardenbergia monophylla,** *Benth.*, (Syn. *H. ovata*, Benth.; *H. cordata*, Benth.; *Kennedya monophylla*, Vent.; *K. longiracemosa*, Lodd.; *K. ovata*, Sims; *Glycine bimaculata*, Curt. Bot. Mag.); N.O., Leguminosæ, B.Fl., ii., 246. *Kennedya monophylla* in Muell. Cens., p. 41.

Commonly, but wrongly, called "Native Sarsaparilla."

The roots of this plant are sometimes used by bushmen as a substitute for the true sarsaparilla (*Smilax*), but its virtues are purely imaginary. It is also a common thing, in the Spring, in the streets of Sydney, to see persons with large bundles of the leaves on their shoulders, doubtless under the impression that they have the leaves of *Smilax glycyphylla*.

All the colonies except Western Australia.

75. **Herpestis Monnieria,** *H.B.et.K.*, (Syn., *Bramia indica*, Lam.) ; N.O., Scrophularineæ, B.Fl., iv., 491. *Bramia indica* in Muell. Cens., p. 97.

This small creeping plant is common to the tropical portions of both hemispheres. It is regarded by the Hindoos as a powerful diuretic and aperient, and the juice of the leaves, conjoined with petroleum, is used in India as a local application in rheumatism. "Whatever benefit is derived from this formula is doubtless due to the petroleum." *(Pharm. of India.)*

New South Wales and Northern Australia.

76. **Hibiscus diversfolius,** *Jacq.*, (Syn., *H. ficulneus*, Diss., non Linn.); N.O., Malvaceæ, B.Fl., i., 213.

"Cooreenyan" of the aboriginals of the Cloncurry River (North Queensland).

The native physicians of Fiji use the juice of the leaves to procure abortion. (Seemann.)

New South Wales and Queensland.

77. **Hydrocotyle asiatica,** *Linn.*, (Syn. *H. repanda*, Pers.; *H. cordifolia*, Hook. f.) ; N.O., Umbelliferæ, B.Fl., iii., 346.

In anæsthetic leprosy good results have followed the use of this herb, but it possesses no claim to the character of a specific attributed to it by some. It has been found more useful in secondary or constitutional syphilis, especially in those cases where the skin and subjacent cellular tissue are principally affected. In non-specific ulcerations, and in skin diseases, it is of value, both as an internal and as a local remedy. (*Pharm. of India.*)

All the colonies.

78. **Indigofera enneaphylla,** *Linn.;* N.O., Leguminosæ, B Fl. ii., 196.

An infusion of the whole plant is diuretic, and as such is given in fevers and coughs in India. (Ainslie.) It is not endemic in Australia.

South Australia, New South Wales and Northern Australia.

79. **Ionidium suffruticosum,** *Ging.*, (Syn. *Pigea Banksiana*, DC.; *Hybanthus enneaspermus*, F.v.M.); N.O., Violaceæ B.Fl. i., 101; *H. enneaspermus* in Muell. Cens., p. 6; see also Muell. Fragm., x. 81, where no less than eighteen synonyms of this species are given.

Mr. F. M. Bailey *(Proc. Linn. Soc., N.S.W., 1883*, p. 3) points out that the roots of this species are used in India in diseases of the urinary organs, and the leaves as an external application. Other species are used medicinally in various parts of the world, and there is no doubt that the Australian species possess medicinal properties. This particular species is widely spread over tropical Asia and Africa.

North and South Australia, New South Wales and Queensland.

80. **Ipomœa Pes-capræ,** *Roth.*, (Syn. *I. maritima*, R.Br.; *I. biloba*, Forsk.; *Convolvulus pes-caprae*, Linn.; *C. maritimus*, Desr.; *C. bilobatus*, Roxb.; C. *brasiliensis*, Linn.); N.O., Convolvulaceæ, B.Fl. iv., 419.

The boiled leaves are used externally as an anodyne in cases of colic, and in decoction in rheumatism; the juice is given as a diuretic in dropsy, and at the same time the bruised leaves are applied to the dropsical part. (Dymock, *Materia Medica of Western India.*)

Western Australia, New South Wales and Northern Australia.

81 **Justicia procumbens,** *Linn.*, (Syn. *J. juncea*, R.Br.; *J. media*, R.Br.; *J. adscendens*, R.Br.; *Rostellaria* (*Rostellularia*) *procumbens*, Nees; *R. media*, Nees; *R. juncea*, Nees; *R. pogonanthera*, F.v.M.); N.O., Acanthaceæ, B.Fl., iv, 549

In South India the juice of the leaves squeezed into the eyes is a remedy in ophthalmia. (Drury.)

All the colonies except Tasmania and Victoria.

82. **Lagenaria vulgaris,** *Seringe*, N.O., Cucurbitaceæ, B.Fl., iii., 316.

"Bottle Gourd."

This plant, so plentiful along the tropical coast of Queensland, is said to be a dangerous poison. It is said that some sailors were killed by drinking beer that had been standing for some time in a bottle formed of one of these fruits. (F. M. Bailey.)

Queensland.

83. **Laportea gigas,** *Wedd.*, (Syn. *Urtica gigas*, A. Cunn.; *U. excelsa*, Wedd.; *Urera rotundifolia*, Wedd.); N.O., Urticeæ, B.Fl., vi., 191.

"Giant Nettle." "Irtaie" of the aboriginals of the Richmond and Clarence, New South Wales. "Goo-mao-mah" is another aboriginal name.

The poisonous fluid secreted from the foliage is very powerful, particularly in the younger leaves, and their sting is exceedingly virulent, producing great suffering. Cattle become furious when they come in contact with the leaves. It is stated that the pain caused by the sting of this plant will be instantly relieved by the milky juice of the lower part of the stem of *Colocasia macorrhiza* ("Cunjevoi" of the natives), being rubbed on the affected part. (*Proc. R.S. Queensland*, 1885.)

New South Wales and Queensland.

84. **Mallotus phillipensis,** *Muell. Arg.*, (Syn. *Rottlera tinctoria*, Roxb.; *Croton philippensis*, Lam.; *Echinus philippensis*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 141.

"Kamala" of India. "Poodgee-poodgera" of the Queensland aboriginals.

The reddish powder from the capsules of this plant, called "Kamala" by the Hindoos, is a useful vermifuge, especially adapted for the expulsion of tænia.

Anderson found that a concentrated ethereal solution of Kamala allowed to stand for a few days, solidified into a mass of granular crystals, which by repeated solution and crystallisation in

ether were obtained in a state of purity. This substance, named by him *Rottlerin*, forms minute, platy, yellow crystals of a fine satiny lustre, readily soluble in ether, sparingly in cold alcohol, more so in hot, and insoluble in water. The mean of four analyses gave its composition as $C_{22}\ H_{20}\ O_6$. (*Pharmacographia.*)

New South Wales and Queensland.

85. **Melaleuca uncinata,** *R.Br.*, (for synonyms and vernacular names see "Essential Oils.") N.O., Myrtaceæ, B.Fl., iii., 150.

A "Tea-Tree."

According to Mr. J. G. O. Tepper (*Proc. R.S., S.A.*, iii., 174), the leaves of this plant, if chewed, are very useful in alleviating and curing ordinary catarrh. This observation is well worth repeating, especially as this particular species is widely distributed, and as there is no reason to suppose that this property is confined to this species.

Western and South Australia, Victoria, New South Wales and Queensland.

86. **Melastoma malabathricum,** *Linn.*, (Syn. *M. polyanthum*, Blume; *M. denticulatum*, Labill.; *M. Novæ-Hollandiæ*, Naud.); N.O., Melastomaceæ, B.Fl., iii., 292.

The leaves are used in India in cases of diarrhœa and dysentery. (F. M. Bailey.)

From New South Wales to Northern Australia.

87. **Melia composita,** *Willd.*, (Syn. *M. Azedarach*, Linn.; *M. australasica*, A. Juss.); N.O., Meliaceæ, B.Fl., i., 380.

"Dygal" of the aboriginals of Northern New South Wales. "White Cedar" and "Cape Lilac" of the colonists. Called "Persian Lilac," and other names, in India.

The Hindoos use the flowers, fruit, leaves, and bark for many medical purposes. The root-bark is on the secondary list of the United States Pharmacopœia as an anthelmintic. In large doses it is said to produce narcotic effects, though these, if produced, pass off without injury to the system.

New South Wales to Northern Australia.

88. **Mentha gracilis,** *R.Br.*, (Syn. *Micromeria gracilis*, Benth.); N.O., Labiatæ, B.Fl., v., 83.

"Native Pennyroyal."

Mr. Bäuerlen points out that this plant and *M. satureoides* are used in the southern districts of New South Wales at least, by females in irregularities of the menses, with most satisfactory results. Either infusion or decoction is used. It should, however, be borne in mind that these two species are much more acrid than the European species of *Mentha* commonly used for a similar purpose, and, therefore, greater care should be exercised in their use. Both herbs are also strewn about floors and beds for the purpose of keeping away insects, and they are very efficient in driving away fleas and bugs.

All the colonies except Western Australia and Queensland.

89. **Mentha satureioides,** *R.Br.*, (Syn. *Micromeria satureioides*, Benth.); N.O., Labiatæ, B.Fl., v., 84.

See *M. gracilis*.

All the colonies.

90. **Mesembryanthemum æquilaterale,** *Haw.*, (Syn. *M. glaucescens*, Haw.; *M. Rossi*, Haw.; *M. nigrescens*, Haw.; *M. præcox*, F.v.M.); N.O., Ficoideæ, B.Fl., iii., 324.

"Pig's Face." "Berudur" of the aboriginals of the Lachlan River, New South Wales. It was the "Canajong" of the Tasmanian aboriginals.

Many species, and especially *M. acinaciforme*, Linn., from which this species scarcely differs, are used in South Africa. There the expressed juice of the succulent leaves taken internally checks dysentery, and acts as a mild diuretic, while it is also, for its antiseptic property, used as an excellent gargle in malignant sore throat, violent salivation, and aphthæ, or in the form of a lotion in burns and scalds. (Bailey in *Syn. Qd. Flora.*)

Near the coast in all the colonies.

91. **Morinda citrifolia,** *Linn.*, (Syn. *M. quadrangularis*, Don.); (For other synonyms see "Timbers.") N.O., Rubiaceæ, B.Fl., iii., 423.

"Indian Mulberry."

The Cochin-Chinese place this amongst their medicinal plants, believing the fruit to be deobstruent and emmenagogue. In Bombay the leaves are used as a healing application to wounds and ulcers, and are administered internally as a tonic and febrifuge. (Dymock.)

Queensland and Northern Australia.

92. **Mucuna gigantea**, *DC.*, (Syn. *Carpopogon giganteum*, Roxb.); N.O., Leguminosæ, B.Fl. ii., 254.

Used in India in rheumatic complaints. The bark for this purpose is pulverised, mixed with dry ginger, and rubbed over the parts afflicted. (Rheede.)

New South Wales to Northern Australia.

93. **Myriogyne minuta**, *Less.*, (Syn. *M. Cunninghamii*, DC.; *Centipeda orbicularis*, Lour., *C. Cunninghami*, F.v.M.; *Sphæromorphæa centipeda*, DC.; *S. Russelliana*, DC.; *Cotula minuta*, Forst.; *C. cuneifolia*, Willd.; *Grangea cuneifolia*, Poir.; *G. minuta*, Poir; *G. decumbens*, Desf.; *Artemisia minima*, Thunb.); N.O, Compositæ, B.Fl. iii., 553; *Centipeda orbicularis* and *C. Cunninghami*, as distinct species, in Muell. Cens., p. 84 See also Muell. Fragm. viii., 143.

"Gukwonderuk" of the aboriginals at Lake Hindmarsh Station, Victoria. "Sneezeweed" of Southern New South Wales.

The following letter from the Rev. Dr. Woolls (then of Richmond), to the editor of the *Sydney Morning Herald*, appeared in that journal on Christmas Day, 1886. I give it in full, as if this plant only partially realizes the expectations formed of it, it will be a valuable addition to our indigenous vegetable materia medica.

Following is Dr. Wooll's letter:—"Some weeks since, the Rev. S. G. Fielding, of Wellington, called my attention to a weed (known to botanists as *Myriogne minuta*, of the composite order,)

which he stated had been used with success in cases of blight. Being anxious to test the efficacy of the remedy, and to ascertain whether any bad effects would arise from its application, I placed some of it in the hands of Dr. Jockel of this town, who has furnished me with the following remarks: 'I have much pleasure in testifying to the efficacy, in cases of ophthalmia, of the plant which you so kindly sent me. A case came under my notice a few days ago of a drover who was suffering from a severe form of purulent ophthalmia, contracted up the country. I made an infusion of the plant according to directions, and the first local application seemed to have almost a magical effect. The man expressed himself as relieved at once of the intense smarting which he had previously suffered. He got on so well that in two days he was able to start back up country again, and could hardly express his gratitude for the very great relief afforded. LOUIS C. JOCKEL.'

"I find, from a communication of Baron Mueller, that for some time past he has had an idea that *Myriogyne* might be utilised for medicinal purposes, and that he had actually submitted it to Dr. Springthorp, an eminent physician in Melbourne, for the purpose of experiment. The Baron, however, was not aware of its efficacy in simple ophthalmic inflammation, and he regarded the discovery as interesting. I mention this as a matter of justice to Dr. Jockel, who, I believe, is the first medical man in Australia who has proved the value of *Myriogyne* in a case of ophthalmia. This weed, growing as it does on the banks of rivers and creeks, and in moist places, is common to all the Australian colonies and Tasmania, and it may be regarded as almost co-extensive with the disease it is designed to relieve. It is described in the *Flora Australiensis*, vol. iii., p. 553, and figured amongst Baron Mueller's plants of Victoria. In the document relating to the Intercolonial Exhibition, 1866-67, it is noticed as remarkable for its sternutatory properties, and recommended for the manufacture of snuff; and I find that Endlicher, in alluding to the species of the genus of *Myriogyne*, characterises them as *herbæ ramosissimæ acres sternutatoriæ*, (*Genera Plantarum*, p. 440)."

The Rev. Mr. Hartmann says (Brough-Smyth's *Aborigines of Victoria*, ii., 173) that this plant is used as medicine by the

aborigines of Lake Hindmarsh, but he does not say for what complaint.*

It is also found in India, Madagascar, and Japan. The natives of India consider it a hot and dry medicine, useful in paralysis, pains in joints, and special diseases; also as a vermifuge. (*Cyclop. of India.*)

Throughout the colonies.

94. **Nelumbium speciosum,** *Willd.*, (Syn. *Nelumbo nucifera,* Gaertn.); N.O., Nympheaceæ, B.Fl., i., 62. *N. nucifera* in Muell. Cens., p. 1.

"Pink Water Lily."

The milky viscid juice of the flower-stalks and leaf-stalks is used in India as a remedy against sickness and diarrhœa. (Endlicher, quoted by Bailey.) The petals of the flower are also stated to be astringent. It is commonly distributed in the warmer regions of Asia.

Queensland.

95. **Ocimum sanctum,** *Linn.*, (Syn. *O. anisodorum,* F.v.M.; *O. caryophyllinum,* F.v.M.); N.O., Labiatæ, B.Fl., v., 74.

"Mooda" of the aboriginals of the Cloncurry River, and "Bulla-bulla" of those of the Mitchell.

This plant is much cultivated in India and Ceylon, and is frequently used in medicine in the latter country. (*Treasury of Botany.*) Stimulant, diaphoretic and expectorant virtues are assigned to it by the natives. (*Pharm. of India.*)

Queensland and Northern Australia.

96. **Pagetia medicinalis,** *F.v.M.*, N.O., Rutaceæ, Muell. Cens., p. 12.

The oil of the leaves is supposed to be of medicinal value. (Bailey.)

Queensland.

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* There is a figure of *Centipeda (Myriogyne) Cunninghami* in Mueller's *Plants Indigenous in Victoria.* Other synonyms of *C. orbicularis*, beyond those given, will be found in *Muell. Fragm.*, viii., 142.

The Baron prepared a snuff from this plant, which he exhibited at the Intercolonial Exhibition of Melbourne, 1886.

97. **Petalostigma quadriloculare,** *F.v.M.*, (Syn. *P. triloculare*, Muell. Arg.; *P. australianum*, Baill.; *Hylococcus sericeus*, R.Br.); N.O., Euphorbiaceæ, B.Fl., vi., 92.

"Crab Tree." "Native Quince." "Emu Apple." "Bitter Bark." "Quinine Tree." "Muntenpen" of some Queensland aboriginals.

The bark contains a very powerful bitter, said to have the same properties as cinchona. (Hill.) Tenison-Woods, however, states (*Explorations in Northern Australia*): "It is usually covered with fruit like a small yellow plum, of eminently nasty taste. This is, I believe, its only claim to be called a "quinine." This surmise is hardly correct.

The stem-bark contains, together with the ordinary plant-constituents, a camphoroidal essential oil, and an indifferent bitter principle belonging to the glucosides.

The ash of the bark (8.3 per cent.) contains, in 100 parts:—

Sodium Chloride	2.94
Potash	2.75
Soda	0.94
Lime	46.23
Magnesia	1.43
Alumina	0.05
Ferric Oxide	0.18
Manganoso-Manganic Oxide... ...	0.46
Sulphuric anhydride	1.32
Phosphoric pentoxide	0.56
Silica	2.21
Carbonic Acid	40.33

(Falco, in *Watts' Dict.*, vi., 1st Suppt. 904.)

New South Wales to Northern Australia.

98. **Piper Novæ-Hollandiæ,** *Miq.*; N.O., Piperaceæ; B.Fl. vi., 204.

"Native Pepper." "Mao-warang" was an aboriginal name.

An excellent stimulant tonic to the mucous membrane. Used by Dr. Bancroft in the treatment of gonorrhœa, and other mucous discharges, with considerable success. This is one of the largest native creepers, the root being at times from six inches to a foot in

diameter. The plant climbs like ivy to the top of the tallest trees, and when full grown weighs many tons, so that a good supply of the drug is readily obtainable. The active principle, as dissolved out by ether, is a brownish oily fluid, soluble in water to a limited extent only, the insoluble portion producing an oily emulsion. It has a warm, aromatic, pleasant taste, and a benumbing effect on the tongue, when applied to it in minute quantity. (Bancroft.)

New South Wales and Queensland.

99. **Pittosporum undulatum,** *Vent.;* N.O., Pittosporeæ, B.Fl. i., 111.

"Native Laurel." "Mock Orange."

I am not aware that this plant is employed medicinally, but the following chemical investigation of the bark will be found interesting, and may do something towards preparing the way for its utilization.

Pittosporine. Glucoside of the bark and fruits of *Pittosporum undulatum.* The pulverised bark is extracted with hot alcohol, filtered when cold, mixed with an equal bulk of ether, filtered again, and evaporated. It is a whitish, loose powder, sweetish at first, afterwards bitter and acrid; dissolves in water and alcohol, not in ether; froths with water, gives precipitates with acetate and sub-acetate of lead. Separates, by boiling with diluted acids, into sugar and a white substance, insoluble in water. (Mueller and Rummel, in Wittstein's *Organic Constituents of Plants.*)

All the colonies except South and Western Australia.

100. **Plumbago zeylanica,** *Linn.*, N.O., Plumbagineæ, B.Fl., iv., 267.

In India, a tincture of the root-bark has been employed as an antiperiodic. Dr. Oswald states that he has employed it in the treatment of intermittents with good effect. It acts as a powerful sudorific. *(Pharm. of India.)* It is a common medicine for dyspepsia in India. It is also frequently used as a poultice for abscesses, &c.

New South Wales to Northern Australia.

101. **Polanisia viscosa,** *DC.*, (Syn. *P. icosandra*, Linn.; *Cleome flava*, Banks; *C. viscosa*, Linn.); N.O., Capparideæ, B.Fl., i. 90. *Cleome viscosa* in Muell. Cens., p. 4.

Used by the aboriginals to relieve headache. (Mr. H. W Stone, quoted by Mr. Bailey.) It is also used in Cochin China as a counter-irritant, in the same way as sinapisms in Europe, and also as a vesicant; and in the United States the roots are said to be used as a vermifuge. In India the leaves boiled in ghee are applied to recent wounds, and the juice to ulcers. The seeds are occasionally given in fevers and diarrhœa. (Ainslie. Lindley.)

South Australia, New South Wales to Northern Australia Western Australia.

102. **Pongamia glabra,** *Vent.*, N.O., Leguminosæ, B.Fl., ii., 273.

"Indian Beech."

This tree also grows in tropical Asia and Fiji. In India an oil (called Poonga oil) is extracted from the seeds for use as an illuminant, and as an application in scabies, herpes, and other cutaneous diseases. The oil is also much used as an embrocation in rheumatism. A poultice of the leaves is a popular application in India to foul ulcers. The plant is used medicinally in various ways, and for various purposes, by the people of India. (Dymock.)

Dr. Bancroft (*Proc. R.S., N.S.W., 1886*, p. 70) points out that all parts of this plant contain a principle of great activity as an emetic. Frogs poisoned with extract of the bark vomit for several hours, after which they become torpid, and generally die within forty hours.

Queensland and Northern Australia.

103. **Portulaca oleracea,** *Linn.*, N.O., Portulacaceæ, B.Fl., i., 169.

"Common Pig-weed," or "Purslane." "Thukouro" of the aboriginals of the Cloncurry River, North Queensland.

This plant is a native of most warm parts of the world. It has been cultivated from very ancient times, and possesses anti-scorbutic properties. The young shoots are sometimes put in

salads, and the older ones are used as a potherb or for pickling. (See also "Foods.")

All the colonies except Tasmania.

104. **Pteris aquilina,** *Linn.*, var. **esculenta,** (Syn. *P. esculenta,* Forst.); N.O., Filices, B.Fl., vii., 732.

"Brake Fern," or "Bracken."

The European plant is astringent, bitter, and anthelmintic, and the rhizome has been used as a substitute for hops.

All the colonies.

105. **Rhizophora mucronata,** *Linn.*, (Syn. *R. Mangle,* Roxb.; *R. Candelaria,* Wight et Arn.); N.O., Rhizophoreæ, B.Fl., ii., 493.

A "Mangrove."

The bark has been tried medicinally in cases of hæmaturia, but with what result I have been unable to learn. For notes on the medicinal utilization of the astringency of this tree, see *Pharm. Journ.*, vi., 11.

New South Wales to Northern Australia.

106. **Sarcostemma australe,** *R. Brown,* N.O., Asclepiadeæ, B.Fl., iv., 328.

Called "Gaoloowurrah" by Northern Territory natives.

The juice is used by the Port Darwin (Northern Territory of South Australia) natives as a remedy in smallpox. (*Proc. R.S., S.A.*, v., 9.) In the interior districts of New South Wales its milky juice is used by white men as an application to wounds.

All the colonies except Victoria and Tasmania.

107. **Schmidelia serrata,** *DC.*, (Syn. *S. timoriensis,* DC.; *Ornitrophe serrata,* Roxb.; *Allophyllus ternatus,* Lour.); N.O., Sapindaceæ, B.Fl., i., 455. *Allophyllus ternatus* in Muell. Cens., p. 24.

The astringent root is employed in parts of India to check diarrhœa. (*Cyclop. of India.*)

Queensland and Northern Australia.

108. **Scoparia dulcis,** *Linn.*, N.O., Scrophularineæ, B.Fl., iv., 504.

This plant is a native of every part of the world, within the tropics. In India it is used in infusion in ague. (*Cyclop. of India.*)

Queensland and Northern Australia.

109. **Sebæa ovata,** *R.Br.*, (Syn. *Exacum ovatum*, Labill.; *Erythræa chloræfolia*, Lehm.); N.O., Gentianeæ, B.Fl., iv., 371.

This neat little annual herb can be utilized for its bitter tonic principle. It and *Erythræa australis* (which see) may be used indiscriminately.

Throughout the colonies.

110. **Semecarpus Anacardium,** *Linn.*, (Syn. *S. australasicus*, Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut Tree" of India.

This tree is common in some parts of India. The hard shell of the fruit is permeated by a corrosive juice, which is employed externally in sprains and rheumatic affections, in scrofulous eruptions, and for destroying warts. (*Treasury of Botany.*) The nut is also used to produce the appearance of a bruise in support of criminal charges preferred through enmity, its application in a diluted form producing great œdematous swelling and redness of the skin. It is also used as a fumigation for hæmorrhoids in India; it causes sloughing of the tumours. It is given internally in asthma, after being steeped in buttermilk, and is also given as a vermifuge. Both the nut and the oil obtained from it are used in India for purposes too numerous to mention. (Dymock, *Materia Medica of Western India.*)

Queensland and Northern Australia.

111. **Sesbania ægyptica,** *Pers.*, (Syn. *Œschynomene Sesban*, Linn.); N.O., Leguminosæ, B.Fl., ii., 212.

"Ngeen-jerry" of the aboriginals of the Cloncurry River, North Queensland.

In India the leaves of this shrub are used as a cataplasm to promote suppuration. (*Cyclop. of India.*) The warmed leaves are simply moistened with a little castoı oil.

Queensland and Northern Australia.

112. **Sida rhombifolia,** *Linn.*, (Syn. *S. retusa*, Linn.); N.O., Malvaceæ, B.Fl., i., 196.

"Queensland Hemp." Called "Paddy Lucerne" on the Richmond and Clarence Rivers, New South Wales; "Native Lucerne," is a common name, also "Jelly Leaf."

This herb is largely used by the natives of India in consumption and rheumatism. It is given as an infusion, and is said to promote perspiration; the leaves are used as a poultice for snake-bites, and in cases of the stings of wasps and other insects. It contains a quantity of mucilage, which, no doubt, accounts for its use in diseases of the chest. (*Pharm. of India.*) Its colonial name of "Jelly Leaf" is in allusion to its mucilaginous nature.

South Australia, New South Wales to Northern Australia.

113. **Smilax glycyphylla,** *Smith*, N.O., Liliaceæ, B.Fl., vii., 7.

"Native Sarsaparilla," "Sweet Tea."

This plant has been recommended as an alterative and tonic and anti-scorbutic. It is one of the earliest plants pressed into the service of medicine in New South Wales. At p. 230, *Journal of a Voyage to New South Wales*, by John White, Esq., Surgeon-General to the Settlement, London, 1790, (the information must have been furnished almost immediately after the foundation of the colony), occurs the passage . . . . "good for the scurvy. The plant promises much in the last respect, from its bitter, as a tonic, as well as the quantity of saccharine matter it contains." The decoction is made from the leaves, and is similar in properties but more pleasant in taste, than that obtained from the roots of *S. officinalis*, or Jamaica sarsaparilla. The herb is a common article of trade amongst Sydney herbalists.

Glycyphyllin. Glucoside of the leaves of *Smilax glycyphylla*; a brownish-yellow, amorphous mass, or by slow evaporation of the ethereal solution, concentrically united tufts of crystals of aromatic odour and bitter-sweet taste; dissolves better in hot than

in cold water, easily in alcohol and in ether; breaks up on boiling with dilute sulphuric or hydrochloric acid into sugar and another product. (Mueller and Rummel, in Wittstein's *Organic Constituents of Plants.*)

See also a paper by Prof. Rennie, of Adelaide, on *Glycyphyllin*, the sweet principle of *S. glycyphylla*, in *Journ. Chem. Soc.*, December, 1886.

New South Wales and Queensland.

114. **Sophora tomentosa,** *Linn.*, N.O., Leguminosæ, B.Fl., ii., 274.

"Sea-coast Laburnum."

The roots and seeds have been considered as specifics in bilious sickness. (Bailey.)

New South Wales to Northern Australia.

115. **Tabernæmontana orientalis,** *R.Br.*, N.O., Apocyneæ, B.Fl., iv., 311.

"Bitter Bark."

This small tree has an intensely bitter bark, and a decoction of it is sometimes sold as "bitters."

New South Wales to Northern Australia.

116. **Tacca pinnatifida,** *Forst.*, N.O., Taccaceæ, B.Fl., vi., 458.

The starch from the tubers is far preferable to that of any other arrowroot for dysentery. (*Treasury of Botany.*) This plant is not endemic in Australia.

Queensland and Northern Australia.

117. **Tephrosia purpurea,** *Pers.*, (Syn. *T. piscatoria*, Pers.; *T. toxicaria*, Gaud.; *T. Baueri*, Benth.; *Galega littoralis*, Forst.; *G. piscatoria*, Sol.); N.O., Leguminosæ, B.Fl., ii. 209.

This plant is used in many tropical countries for the purpose of stupefying fish for the sake of capturing them.

In India the plant is described as deobstruent and diuretic, useful in cough and tightness of the chest, bilious febrile attacks, obstructions of the liver, spleen and kidneys; the natives recom-

mend it as a purifier of the blood, and for boils, pimples, &c. (Dymock.)

South Australia; New South Wales to Northern Australia.

118. **Thespesia populnea,** *Corr.*, (Syn. *Hibiscus populneus*, Willd.); N.O., Malvaceæ, B.Fl., i., 221.

The fruit abounds with a yellow viscid juice, which is a valued local application in scabies and other cutaneous diseases amongst the natives of Southern India, the affected parts being also washed daily with a decoction of the bark of the tree. (*Pharm. of India.*)

Queensland and Northern Australia.

119. **Trichodesma zeylanicum,** *R.Br.*, (Syn., *Pollichia zeylanica*, F.v.M.); N.O., Boragineæ, B.Fl., iv., 404. *P. zeylanica* in Muell. Cens., p. 100.

In India this, with other species, is considered diuretic, and one of the cures for the bites of snakes. (Bailey.)

All the colonies except Victoria and Tasmania.

120. **Typha angustifolia,** *Linn.*, N.O., Typhaceæ, B.Fl., vii., 159. A Bull-rush."

The root-stock, which abounds in starch, is somewhat astringent and diuretic, and is employed in Eastern Asia in dysentery, gonorrhœa, and the measles.

All the colonies.

121. **Urena lobata,** *Linn.*, N.O., Malvaceæ, B.Fl., i., 206.

This common tropical weed possesses mucilaginous properties, for which reason it is used medicinally in India. In Brazil a decoction of the root and stem is used as a remedy for windy colic, and the flowers as an expectorant in dry and inveterate coughs, according to Mr. F. M. Bailey.

Oueensland and Northern Australia.

122. **Zanthoxylum veneficum,** *Bailey,* N.O., Rutaceæ. (Suppt. to *Queensland Flora.*)

The bark possesses a peculiar tingling, hot taste, like aconite. Numerous experiments were made with extract of the bark upon dogs, cats, rats, frogs, and grasshoppers. It acts upon the spinal cord, increasing the reflex excitability, and finally paralysing the cord. It poisons grasshoppers, while strychnine has no action upon them. It tetanises frogs, even when applied to the skin. In its physiological action it resembles strychnine. The following may be taken as a typical example of the effect of this substance upon warm-blooded animals :—

Four grains of the alcoholic extract suspended in five minims of water and five of spirit were injected under the skin of a large cat. Immediately afterwards, the cat was uneasy, would lie down, then raise itself, walk a little, and lie down again. In eighteen minutes a tremor of the head and ears was noticed, the pupils were dilated, locomotion was affected; the animal could only walk a yard or so, in a stiff, awkward way. In twenty minutes the tremors were frequent, and power to walk almost gone. In thirty minutes there were convulsive contractions of the fore limbs and muscles of the chest ; a strong light would not alter the iris. In thirty-three minutes the lips were livid, and tetanic convulsions commenced; during one of these attacks the respiration is very laboured, inspiration stertorious, the head hangs down, and the cat jerks itself backwards ; directly after, the spasm goes off, the cat lies down exhausted. In forty-five minutes there was a tetanic spasm every minute, and the animal was expected to die every convulsion. In fifty-five minutes tetanic spasms last about a quarter of a minute; inspiration extremely laboured and prolonged, with wheezing. At times no air can be inspired, and the chest becomes collapsed. In sixty minutes the cat jumped and fought for breath in a frightful way, and died. The heart could be felt to beat regularly for two minutes afterwards. Four hours after death there was *rigor mortis*, the right side of the heart was empty, and the left ventricle firmly contracted; the intestine was bloodless and contracted.

With larger doses than five grains tetanic spasms come on rapidly, and the animals die in a few minutes. Large dogs recover sometimes after five grains have been injected under the skin. (Dr. Bancroft, in *Proc. R.S., N.S.W.*, 1886, p. 70.)

Queensland.

123. **Zizyphus jujuba,** *Lam.*, N.O., Rhamneæ, B.Fl., i., 412.

"Jujube Tree" of India.

The French prepare a demulcent *Pâté de Jujubes* from the fruits of this tree. Various parts of the tree are used in native medicine in India. The bark is a powerful astringent; the dried and powdered fruit is used in medicine, as are also the leaves, and a decoction of the root. (Dymock.)

Queensland.

Gums, Resins, and Kinos.

A. (GUMS.)

DEFINITIONS.

The following definitions are complete enough for ordinary purposes :—

(*a*) A *gum* is entirely soluble or swells up in water, but entirely insoluble in alcohol (commonly called "spirit"). *E.g.*, "Wattle-gums." *(Acacia.)*

(*b*) A *resin* is entirely soluble in alcohol, but entirely insoluble in water. *E.g.*, "Pine resin." *(Frenela Endlicheri.)*

(*c*) A *gum-resin* is intermediate in character between a gum and a resin, that is to say, it is partly soluble in water and partly soluble in alcohol. *E.g.*, the gum-resin of *Pittosporum undulatum*.

(*d*) A *kino* is the astringent inspissated juice of a tree; excellent examples are afforded by the various species of *Eucalyptus*.

Important note. The classification of the exudations from some of the species is only intended to be provisional. In the absence of some of the products which I have had no opportunity of examining, I am unable to say, for instance, whether some of them should be grouped as "gums," or as "gum-resins."

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1. **Acacia spp**, N.O., Leguminosæ.

"Wattles."

These gums are exported for adhesive purposes, for cotton-printing, &c. A large number of *Acacias* yield them in greater or less quantity. Speaking of wattle-gum in general, Bentley and Trimen (*Medicinal Plants*) say: "It is found commonly in large tears or masses, of a dark yellow or reddish-brown colour. This gum, which has a transparent appearance, being nearly free from cracks or fissures, is said to be readily soluble in water, and to

form a very adhesive mucilage. It is frequently contaminated with pieces of the astringent barks of the trees from which it is obtained; hence, its solution, unless carefully prepared, will frequently contain some tannic acid."

The allusion to solubility in the preceding quotation is only partly true. Very little has been done in regard to the systematic examination of our gums, but the writer, as the result of fairly close attention to them during the past few years, hardly inclines to the opinion that there is much commercial future before them. "Best selected Turkey Gum Arabic" is, of course, the most valuable gum yielded by Acacias. If judging were to be by points, it would take the highest place as regards absence of colour, freedom from accidental impurities, ready solubility, and adhesiveness of its mucilage. The highest quality of Australian gum the author has ever seen falls far behind this high standard. As far as his experiments go, those samples obtained from the interior (comparable in its aridity to the Soudan, and other noted gum-producing countries) are completely soluble in water, and make good mucilages, while those obtained east of the Dividing Range, *i.e.*, in well-watered districts, in which vegetation is comparatively luxuriant, are more or less insoluble, portions, at least, merely swelling up in water, like cherry gum. In other words (speaking of the eastern colonies), the eastern wattle-gums contain metagummic acid, while the western ones do not. And when it is borne in mind that the yield of gum in the interior is insignificant as compared with that of the coast country, it becomes apparent how hazardous is the generalization that Australian gums are readily soluble in water.

Owing to the great cost of unskilled white labour in Australia, and the impossibility of utilising the services of the few aboriginals for the purpose of gum collecting, Australian gum arabic will never find its way into the world's markets to any very great extent.

Taken internally, it is used by country folks in diarrhœa and piles, and in veterinary practice in the country, for wounds and raw shoulders in horses; but the uses to which it is put are very miscellaneous.

The author has been shown a statement by a "good practical man," who, by the way, lives in the midst of wattle-trees, and gets his

living by collecting their bark, to the effect that wattle-gum, dissolved in benzole, "makes an excellent carriage varnish." It never occurred to him to try the experiment for himself, and while pointing out that wattle-gum is quite insoluble in that liquid, the present may be a convenient opportunity of again protesting against the reckless statements which are made in regard to our little known raw products.

All the colonies.

2. **Acacia binervata,** *DC.*, (Syn. *A. umbrosa*, A. Cunn.); N.O., Leguminosæ, B.Fl. ii., 390.

"Black Wattle" of Illawarra (New South Wales), and other places. "Hickory." "Myimbarr" of the aboriginals of Illawarra.

Yields an inferior gum arabic. It is rather dark, though, if properly sorted, some of it is of a very light, clean colour. It has a dull fracture. As a rule, it does not exude from the trees in large quantities, and, therefore, usually comes to market with adherent bark, through having been chipped off the tree to waste no gum. It dissolves but fairly well in water, leaving rather a considerable quantity of insoluble matter in the form of a flocculent deposit.

New South Wales and Queensland.

3. **Acacia dealbata,** *Link.* (Syn. *A. irrorata*, Sieb.); N.O., Leguminosæ, B.Fl. ii., 415.

"Silver Wattle."

The gum from this tree is exceedingly viscous, and is quite as useful as some low kinds of gum arabic, taking high-rank amongst wattle-gums. It varies from a light sherry colour to a very dark and dirty colour, and can frequently be easily detached from the tree in large masses. It has a clear fracture.

South Australia, Victoria, Tasmania, New South Wales and Queensland.

4. **Acacia decurrens,** *Willd.*, N.O., Leguminosæ, B.Fl., ii., 414.

"Black, Green, or Feathery Wattle," sometimes called "Silver Wattle," once called "Wattah" by the aborigines of the counties of Cumberland and Camden, New South Wales.

This tree yields gum copiously during the summer season. In colour, it is amber of all shades, but often it is one of the

darkest of wattle-gums. It can usually be gathered with fair rapidity without much of the bark adhering. It is scarcely soluble in water, but swells up in that liquid to a great extent. After several days boiling in a large quantity of water it almost entirely dissolves. When quite dry it feels horny under the teeth, though with smart blows it may be reduced to powder. Small boys are well aware of the jelly which it forms when water is added to it. They sweeten it, call the preparation "gum jelly," and consider it exceedingly toothsome. The author has seen it exposed for sale in Sydney labelled "chewing gum," and was told by the shopkeeper that he can sell all that falls into his hands (which is not much) for making jellies, in lieu of isinglass. Some tanners also use this and allied gums, with admixture of glue, for sizing leather.

All the colonies except Western Australia.

5. **Acacia decurrens,** *Willd.*, var. **mollis,** (Syn. *A. mollissima,* Willd.); N.O., Leguminosæ, B.Fl., ii., 415

"Silver Wattle," "Black Wattle" of the early colonists of New South Wales. "Carrong," or "Currong," of the aboriginals of Victoria.

Forms a lower class gum arabic. It is sometimes substituted for that from *A. dealbata*, but it is far inferior. In the *Cat. Intercol. Exh., Melbourne*, 1866, it is stated that the aboriginals of the Yarra used this gum for fixing the bottom ends of their spears, which were made from a small wattle in the Loddon district.

Victoria, New South Wales and Tasmania.

6. **Acacia elata,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 413.

This gum is in amber coloured tears. The tree itself is of very local distribution, and as far as the author's experience goes, the gum is very rare. Out of perhaps two hundred individuals examined, only one exuded it to the extent of a quarter of a pound, perhaps half a dozen gave a few grains each, while on the remainder no trace of gum was visible. It is apparently very similar in properties to the gum of *A. decurrens*, but the author has not yet submitted it to close examination.

New South Wales.

7. **Acacia farnesiana,** *Willd.*, (Syn. *A. lenticillata*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 419.

"Dead Finish."

This gum is collected in Sind, and forms a part of what is known in Bombay as "Karachi Gum"—a kind of gum arabic. (Dymock, *Materia Medica of Western India*, p. 281.) The author has not heard of its collection in Australia.

South Australia, New South Wales, Queensland, Northern and Western Australia.

8. **Acacia glaucescens,** *Willd.*, (Syn. *A. homomalla*, Wendl.; *A. cinerascens*, Sieb.; *A. leucadendron*, A. Cunn.; *Mimosa binervis*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 406.

"Yarran." A "Myall." A "Rosewood." A "Brigalow" of Western New South Wales; "Motherumba," of North-Western New South Wales; "Kaareewan," of the aboriginals of Cumberland and Camden, New South Wales.

The gum from this tree is said to make excellent adhesive mucilage.

Victoria, New South Wales and Queensland.

9. **Acacia harpophylla,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 389.

"Brigalow."

Yields a gum arabic. Some collected by Mons. Thozet was exhibited at the Intercolonial Exhibition, Melbourne, 1866, but neither of this nor of the gum from **A. Bidwilli,** *Benth.*, exhibited on the same occasion, were any particulars given.

South Queensland.

10. **Acacia homalophylla,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 383.

"Curly Yarran." "Myall" (Victoria). A "Spear-wood." (For aboriginal names, see "Timbers.")

This tree yields a gum copiously throughout the summer season. A specimen in the Technological Museum outwardly resembles, in a striking manner, ordinary pine resin or "rosin." Its fracture is conchoidal, and very lustrous. From its resemblance to "rosin" its colour is a drawback, but it is a remarkably light and clean gum, and as it is so freely soluble, and so adhesive,

it would well pay to export, could it be obtained in sufficiently large quantites. It yields a fairly pale solution.

Interior of South Australia, New South Wales and Northern Victoria.

11. **Acacia linifolia**, *Willd.*, N.O., Leguminosæ, B.Fl., ii., 371. (For synonyms, see "Timbers.")

Sometimes called "Sally."

This shrub, or small tree, rarely exudes gum, so far as the author's experience goes. But a plant 1½ inch in diameter, found by him at The Valley, Blue Mountains, yielded about an ounce of a pale gum.

New South Wales and Queensland.

12. **Acacia microbotrya**, *Benth.*, (Syn. *A. myriobotrya*, Meissn.; *A. leiophylla* var. *microcephala*, Meissn.; *A. subfalcata*, Meissn.; *A. daphnifolia*, Meissn.; *A. rostellifera*, Seem.; and perhaps *A. pterigoidea*, Seem.); N.O., Leguminosæ, B.Fl., ii., 363.

"Badjong" of the aboriginals.

This species often produces 50lb. from one tree in one season. The aboriginals store it in hollow trees for winter use; it is of a pleasant sweetish taste. (G. Whitfield.) It forms a superior gum arabic.

Western Australia.

13. **Acacia pendula**, *A. Cunn.* (var. **glabrata**, F.v.M.); N.O., Leguminosæ.

A "Yarran."

A sample in the Technological Museum dissolves entirely in cold water, forming a perfectly clear, almost colourless solution of a brownish tint. Like some other wattle-gums, this would require selecting for the market. There is a marked difference in appearance between the old and new gum of this tree. The new gum is in rounded pieces, and very similar in appearance and usual size to Senegal gum and Aden gum arabic. The gum which remains long on the trees becomes filled with minute fissures. The

fissures, which radiate from the centre of a lump, cause the lump to break into sub-triangular or conical pieces.

Interior of New South Wales and Queensland.

14. **Acacia pycnantha,** *Benth.*, (Syn. *A. petiolaris*, Lehm.; *A. falcinella*, Meissn.); N.O., Leguminosæ, B.Fl. ii., 365.

"Golden Wattle." "Green Wattle." "Broad-leaved Wattle."

Yields an inferior gum arabic. A quantity was exhibited at the Intercolonial Exhibition, Melbourne, 1866.

South Australia, Victoria and New South Wales.

15. **Acacia retinodes,** *Schlecht.*; N.O., Leguminosæ, B.Fl. ii., 362.

Said to yield a good gum arabic.

Victoria and South Australia.

16. **Acacia saligna,** *Benth., non Wendl.*, (Syn. *A. leiophylla*, Benth.; *Mimosa saligna*, Labill.); N.O., Leguminosæ, B. Fl. ii., 364 *A. leiophylla* in Muell. Cens., p. 44.

It yields a gum arabic.

Western Australia.

17. **Acacia sentis,** *F.v.M.*, (Syn. *A. Victoriæ*, Benth.); N.O., Leguminosæ, B.Fl., ii., 360.

"Prickly Wattle."

These trees are for the most part small, and gum is found on them very sparingly. Much of it is of a rich amber colour when freshly exuded, while portions of it are nearly as pale as the best Turkey gum arabic. It is sparkling and clean looking, and would be a very acceptable article of commerce if it could be obtained in quantity. It is readily and completely soluble in water, and very easily reducible to a powder, on account of its somewhat vesicular nature.

Interior of all the colonies except Tasmania.

18. **Adansonia Gregorii,** *F.v.M.*, N.O., Malvaceæ, B.Fl., i., 223.

"Sour Gourd." "Cream of Tartar" tree.

A dark red gum exudes from the fruit. (Bentham.)

Northern and Western Australia.

19. **Atalaya hemiglauca,** *F.v.M.*, (Syn. *Thouinia hemiglauca*, F.v.M.); N.O., Sapindaceæ, B.Fl., i., 463.

"White Wood."

This tree exudes a useful pale-coloured gum.

Interior of South Australia, New South Wales and Queensland.

20. **Albizzia procera,** *Benth.*, (Syn. *A. elata*, Roxb.; *Mimosa procera*, Roxb.; *M. elata*, Roxb.; *Acacia procera*, Willd.); N.O., Leguminosæ, B.Fl., ii., 422.

"Tee-coma" of the aboriginals of the Northern Territory.

This tree exudes gum copiously. It is in dull, horny-looking, roundish lumps, usually about the size of a marble. It requires picking, as much of it is dark coloured and inferior. The dull appearance is only superficial, for it has a very bright fracture. It swells up in water to a large extent, and partly dissolves. The soluble portion is clear, and almost colourless. This gum differs in behaviour from such of the Acacia gums as are only partially soluble in water, in that a few hours after placing it in cold water it disintegrates, forming flaky masses, whereas the partially soluble Acacia gums, while likewise swelling up considerably, preserve a certain amount of cohesion for a day or two.

Northern Australia.

21. **Calophyllum inophyllum,** *Linn.*, N.O., Guttiferæ, B.Fl., i., 183.

"Ndilo Tree" of India.

This tree, when wounded, exudes a small quantity of bright green gum, which is not collected, nor does it appear to be made use of in any way. (Dymock, *Materia Medica of Western India.*)

Queensland.

22. **Calophyllum tomentosum,** *Wight.*, (Syn. *C. elatum*, Bedd.); N.O., Guttiferæ, Muell. Cens., p. 8.

"Poon," or "Sirpoon," of India.

The gum of this tree is black and opaque, and much mixed with pieces of corky bark; it has a feebly astringent taste, and is very soluble in cold water, to which it yields a yellow-brown

solution, exhibiting a strong blue fluorescence. If the gum is steeped in water for some time the solution becomes very dark in colour. Alum, followed by carbonate of soda, throws down apparently some of the brown colouring matter without interfering with the fluorescence, as after precipitation the solution, although lighter in colour, is very strongly fluorescent. A solution purified by alum in this way has its fluorescence immediately destroyed by acids, and restored again by alkalies. Examining its absorption spectrum it is found that while fluorescent, the solution gives a broad absorption band at the violet end of the spectrum extending to about G; this band disappears on destroying the fluorescence by acids, but re-appears on the addition of alkalies. The solution of the gum does not appear to rotate polarized light. The gum itself communicates only a very faint fluorescence to rectified spirit. I do not know whether this gum is applied to any industrial or medicinal use, but as it is collected by the natives of India it is probable that it is supposed by them to have some medicinal virtues. (Dymock, *Materia Medica of Western India.*)

Queensland.

23. **Cedrela Toona,** *Roxb.*, (Syn. *C. australis*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 387.

"Red Cedar." (For other names, see "Timbers.")

This tree yields a perfectly transparent pale amber-coloured gum in small quantity.

New South Wales and Queensland.

24. **Erythrina indica,** *Lam.*, N.O., Leguminosæ, B.Fl., ii., 253.

"Indian Coral" Tree.

This tree yields a brown gum of no value. It is not endemic in Australia.

Queensland and Northern Australia.

25. **Flindersia maculosa,** *F.v.M.*, (Syn. *F. Strzeleckiana*, F.v.M.; *Strzeleckya dissosperma*, F.v.M.; *Elæodendron maculosum*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 388. *F. Strzeleckiana* in Muell. Cens., p. 9.

"Spotted, or Leopard Tree."

The gum from this tree forms good adhesive mucilage. It reminds one strongly of East-India gum arabic of good quality. During the summer months large masses, of a clear amber-colour, exude from the stem and branches. It has a very pleasant taste, is eaten by the aboriginals, and forms a very common bushman's remedy in diarrhœa, &c. A sample in the Technological Museum is half as large as an emu-egg, and is frequently obtained in pieces as large as pigeons' eggs. It would be readily sought after in the colony for adhesive purposes if it could be obtained in any quantity.

Northern New South Wales and Queensland.

26. **Hakea acicularis,** *R. Br.*, (Syn. *H. sericea*, Schrad.; *H. decurrens*, R. Br.; *Conchium aciculare*, Vent.; *C. compressum*, Sm.; *Banksia tenuifolia*, Salisb.); N.O., Proteaceæ, B.Fl., v., 514.

A clear, hard, yellowish gum (? gum resin) has been observed on this shrub in the Illawarra district of New South Wales. In the catalogue of Western Australian products at the Intercolonial Exhibition, Melbourne, 1866, it is stated: "Gums of *Hakea* species are found plentifully after the autumn rains."

Tasmania, Victoria and New South Wales.

27. **Macrozamia Fraseri,** *Miq.*, (Syn. *M. spiralis*, Miq.; *M. Preissii*, Lehm.; *Zamia spiralis*, R.Br.; *Cycas Reidlei*, Gaud.; *Encephalartos Fraseri*, Miq.; *E. Preissii*, F.v.M.); B.Fl., vi., 252. *Encephalartos Fraseri* in Muell. Cens., p. 110.

And **M. Miquelli,** *F.v.M.*, (Syn. *Encephalartos Miquelli*, F.v.M.); N.O., Cycadeæ, B.Fl., vi., 253. *Encephalartos tridentatus*, Lehm., in Muell. Cens., p. 110.

Mr. C. R. Blackett, of Melbourne, describes in the Australian supplement to the *Chemist and Druggist*, May, 1882, some experiments upon the gums exuded by the above two species. A quantitative examination remains to be made, but Mr. Blackett states that the gums are analogous to Bassora gum, or tragacanth, but whether they can be used instead of tragacanth remains to be

tried. He gives the results of several qualitative experiments with them.

Western Australia *(M. Fraseri)*; New South Wales *(M. Miquelli)*.

28. **Macrozamia Perowskiana,** *Miq.*, (Syn. *M. Denisonii*, F.v.M.; *Lepidozamia Perowskiana*, Regel.; *Encephalartos Denisonii*, F.v.M.); N.O., Cycadeæ, B.Fl., vi., 253. *Encephalartos Denisonii* in Muell. Cens., p. 110.

A small quantity of gum of this species has been received at the Technological Museum, and apparently much resembles that experimented upon by Mr. Blackett. It is in flattened pieces, reminding one strongly of "button lac," but much lighter in colour even than the "fine button lac" of commerce. The flattened shape is due to the mode of collecting it. A spontaneous flow of gum does not appear to occur in any species, but from the cut ends of the cones and bases of leaves it exudes more or less freely. If put to drain on a plate, the flattened shapes of "button lac" will be very readily obtained. If one of these flattened pieces be placed in water, it begins to swell immediately, and this absorption of water goes on for several days, by the end of which period it has swelled to about fifty times its original size. It then presents the appearance of an almost colourless, quivering jelly. This jelly assumes a pseudo-crystalline appearance, forming angular masses. This result is, of course, in consequence of the minute fissures in the dried gum. It breaks readily, has a bright fracture, and in the mouth feels somewhat like tragacanth.

New South Wales and Queensland.

be picked off. It usually assumes one of two forms, viz., small scaly pieces, reminding one strongly of gelatine before it has been bleached and purified. The prevailing colour is dirty brown, and it is admixed with more or less accidental impurity. But with careful collecting a number of small tear-shaped masses may be obtained, which evidently present the gum in a fairly pure form.

New South Wales and Queensland.

30 **Melia composita,** *Willd.*, (Syn. *M. Azedarach*, Linn.); N.O., Meliaceæ, B.Fl., i., 380. In Muell. Cens., p. 9.

"White Cedar." (For other synonyms and vernacular names, see "Timbers.")

The tree yields a gum similar to that produced from the Acacia, plum and cherry trees; it may be collected in considerable quantity. (Bennett.) A specimen of gum, said to be derived from this tree, is in irregular tears, rather adhesive and dull, with a shining fracture, amber-coloured and brownish, rather friable, mixed with fragments of bark, tasteless, soluble in water. (Cooke, *Gums and Resins of India.*) The author has seen an amber-coloured gum in small quantity exuding from trees of this species near Sydney, but never freely.

New South Wales to Northern Australia.

31. **Nuytsia floribunda,** *R.Br.*, (Syn. *Loranthus floribundus*, Labill.); N.O., Loranthaceæ, B.Fl., iii., 387.

"A Mistletoe."

The gum from this tree is said to make good adhesive mucilage.

Western Australia.

32. **Pittosporum bicolor,** *Hook.*, (Syn. *P. discolor*, Regel.; *P. Huegelianum*, Putterl.); N.O., Pittosporeæ, B.Fl., i., 113.

"Whitewood" of Tasmania, Called "Cheesewood" in Victoria.

This tree is said to yield a pale, useful gum. (See *P. undulatum*, "Resins.")

Tasmania, Victoria and New South Wales.

33. **Pittosporum phillyraeoides**, *DC.*, N.O., Pittosporeæ, B.Fl., i., 113.

Variously called "Butter Bush," "Native Willow," and "Poison-berry Tree." (For the numerous botanical synonyms, see "Timbers.")

This tree is said to yield a gum somewhat similar to gum arabic, and even superior to it. (See *P. undulatum*, "Resins.")

All the colonies except Tasmania.

34. **Semecarpus Anacardium**, *Linn.*, (Syn. *S. australasicus*, Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut Tree" (of India).

In India a brown, nearly insipid gum, exudes from the stem.

Queensland and Northern Australia.

35. **Stenocarpus salignus**, *R.Br.*, N.O., Proteaceæ, B.Fl., v., 539.

"Silver Oak." (For botanical synonyms and vernacular names, see "Timbers.")

Small quantities of gum may occasionally be seen on bruised trees of this species.

New South Wales and Queensland.

36. **Sterculia acerifolia**, *A. Cunn.*, (Syn. *Brachychiton acerifolium*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton acerifolium* in Muell. Cens., p. 15.

"Flame Tree." Lace-bark Tree."

A gummy substance exudes from the trunk of this tree. It looks most like Tragacanth of any of the well-known gums. The same remark is more or less true of other species of *Sterculia.*

New South Wales and Queensland.

37. **Sterculia diversifolia**, (Syn. *Pœcilodermis populnea*, Schott.; *Brachychiton populneum*, R.Br., in Muell. Cens.); N.O., Sterculiaceæ.

"Kurrajong." (For other vernacular names, see "Timbers.")

This tree sometimes yields the tragacanthoid substance already alluded to rather abundantly. Mr. Bäuerlen informs the author that at the foot of a tree about one foot in diameter and thirty feet high, in the Clyde River district of New South Wales, about a

bucketful of gum was found, naturally exuded and partly viscid, while enormous tears had flowed down the stem and were adherent to it.

Victoria, New South Wales and Queensland.

38. **Sterculia rupestris,** *Benth.*, (Syn. *Delabechea rupestris*, Lindl.; *Brachychiton Delabechii*, F.v.M.) ; N.O., Sterculiaceæ, B.Fl., i., 230. *Brachychiton Delabechii* in Muell. Cens., p. 15.

"Bottle Tree," or "Gouty Stem." A "Kurrajong."

A gum exudes freely from the tree, and forms what may be called an inferior tragacanth, for want of a better name.

Sir Thomas Mitchell observed many years ago that when boiling water is poured over shavings of this wood a clear jelly, resembling tragacanth, is formed, and becomes a thick, viscid mass ; iodine stains it brown, but not a trace of starch is indicated in it.

The gum from this tree (and the following description is more or less true of other species of this genus) is remarkably like paraffin in appearance, and almost as free from colour. It is rather tough and horny, and breaks with a dull fracture. In the mouth the author fails to detect (except in the shape of the pieces) any difference between it and the best tragacanth. It is in irregular lumps, full of angles and points, the result of the fusion of innumerable "tears."

Sterculia gum and tragacanth, however, present many points of difference. Their closest similarity is in outward appearance. The former gum does not thicken water, except to an almost inappreciable extent, and, therefore, could not have the economic uses to which the very viscid tragacanth is put. On treating them both with cold water, the most obvious difference between them is the bluish-opalescent, and comparatively fine-grained appearance of the mucilage afforded by the Sterculia gum.

Queensland.

39. **Terminalia sp,** N.O., Combretaceæ.

For a note on gum from a species of *Terminalia*, see "Foods," page 62.

40. **Xylomelum pyriforme,** N.O., Proteaceæ, B.Fl., v., 408.

"Native Pear." (For other vernacular names and botanical synonyms, see "Timbers.")

The author is not aware that the finding of gum on this tree has been previously announced. In the Blue Mountains he found about an ounce on a sapling six inches in diameter, which had been cut down, leaving four feet of stump, from which there was a free growth of new leaves. It is of a yellowish-brown colour, tough, and of dull appearance. It may turn out to be a gum-resin, as the author is inclined to think that all the gums of the Proteaceæ will be found to contain a small percentage of resin.

New South Wales.

GUMS, RESINS, AND KINOS.

B. (RESINS.)

INCLUDING GUM-RESINS.

1. **Aleurites moluccana,** *Willd.*, (Syn. *A. Ambinux*, Pers.; *A. triloba*, Forst.; *Jatropha moluccana*, Linn.); N.O., Euphorbiaceæ, B.Fl., vi., 129. *A. triloba* in Muell. Cens., p. 20.

"Candle-Nut Tree."

This tree exudes a resin, especially from the fruits. It is little, if ever, used in Australia, but Dr. George Bennett states that the natives of the South Sea Islands chew it.

Queensland.

2. **Araucaria Bidwilli,** *Hook.*, N.O., Coniferæ, B.Fl., vi., 243.

"Bunya Bunya."

A sample of resin from this species is in the Technological Museum, and it is as different from the resin of *A. Cunninghamii* as it is possible for it to be. It is rather brighter in colour than a low-grade red grass-tree gum (*Xanthorrhœa arborea*), otherwise they are very similar in appearance. Except in redness of colour, it is much like some samples of inferior gum benzoin. It has an odour like creasote. Its prevailing colour is purple-brown, and lustre dull-resinous. It is quite brittle, and powders readily. It stains the fingers with handling, and is gritty to the teeth. When powdered, it is of a bright red, something between Venetian and Indian red, exhibiting a very pleasing colour. The pure resin is clear, and very like that of the Moreton Bay Pine.

Queensland.

3. **Araucaria Cunninghamii**, *Ait.*, N.O., Coniferæ, B.Fl., vi., 243.

"Moreton Bay Pine," "Hoop Pine," "Colonial Pine." "Coorong" of the aboriginals of the Richmond River, New South Wales. "Cumburtu" of those of Brisbane, and "Coonam" of those of Wide Bay, Queensland.

The resin which exudes from this tree is very remarkable, as it is transparent and nearly colourless, and that portion of it which adheres to the trees hangs from them in pendants, which are sometimes three feet long and six to twelve inches broad. (Hill.)

This tree is very rich in resin, as it flows from every slight wound. A sample in the Technological Museum is very much like gum Thus or common Frankincense, the product of *Pinus australis*, except that it is paler in colour, having the colour of and lustre of amber. Although these pieces have been collected some years, and externally are quite hard and very brittle, yet internally they are still in a viscid condition, and possess the pleasing odour of Canada Balsam, with perhaps a trace of creasote.

Northern New South Wales and Queensland.

4. **Atherosperma moschata**, *Labill.*, N.O., Monimiaceæ, B.Fl., v., 284.

"Sassafras."

The resin contained in the bark of this tree has been examined by Zeyer *(Pharm. Viertelj, x., 517)*, an abstract of whose paper appears in *Gmelin's Handbook*. The following is his account of it. The bark, previously exhausted with water, is exhausted with very weak caustic potash; the solution is allowed to stand till clear, and the resin is precipitated by hydrochloric acid. The precipitate is indigested with alcohol, the extract evaporated, and the residue boiled with water, and dried. Brown-red, melts at 104° C. Dissolves easily in caustic alkalies and their carbonates, from which it is precipitated by acids, and also in alcohol, but it is nearly insoluble in ether. Contains at 100° C, on the average 69.38 °/₀ C, 8.85 °/₀ H, and 21·77 O, corresponding to the formula $C_{42} H_{32} O_{10}$.

Tasmania, Victoria and New South Wales.

5. **Bertya Cunninghamii**, *Planch.*, N.O., Euphorbiaceæ, B.Fl., vi., 75.

The branchlets of this plant exude a clear gum-resin so abundantly as to give dried specimens, when held up to the light, a pretty hyaline appearance. The substance is of a yellowish colour, and no doubt would prove exceedingly interesting if examined, but the author has, up to the present, been unsuccessful in obtaining a quantity of it. It has a pleasant, bitter taste, something like wormwood.

Many of our Euphorbiaceous plants yield resin in greater or less quantity, and will provide useful material for future experiment.

Victoria and New South Wales.

6. **Beyeria viscosa**, *Miq.* (For synonyms, see "Timbers,") N.O., Euphorbiaceæ, B.Fl., vi., 61.

The "Pink Wood" of Tasmania. Called also "Wallaby Bush."

A resinous substance exudes from the leaves, sometimes so abundantly that characters can be traced in it by means of a style.

All the colonies.

7. **Ficus macrophylla**, *Desf.*, N.O., Urticeæ, B.Fl., vi., 170.

"Moreton Bay Fig," "Karreuaira," or "Waabie," of the aboriginals.

The milky sap (latex) of this tree yields a very fair caoutchouc. Other species of *Ficus* yield juices more or less similar.

Northern New South Wales and Queensland.

8. **Ficus rubiginosa**, *Desf.*, (Syn. *F. australis*, Willd.; *Urostigma rubiginosum*, Gaspar.); N.O., Urticeæ, B.Fl., vi., 168.

"Port Jackson Fig," "Narrow-leaved Fig," "Native Banyan," "Dthaaman" of the aboriginals.

This fig, like other figs, exudes a juice when the bark is wounded. At present, it is put to no useful purpose. It has formed the subject of the following chemical investigation :—

"The resinous exudation of this tree resembles Euphorbium in appearance, varies in colour from dirty yellow or red to almost white, solid, generally brittle, but tough in the interior of large pieces, opaque, with dull and wax-like fracture; at 30° C it softens

and becomes plastic, like gutta-percha, but not sticky, provided it has been previously wetted with water. In its natural state it has neither taste nor odour, but evolves an odour like that of wax when heated, and evinces a characteristic taste on being masticated. It is quite insoluble in water, either hot or cold. The greater part of it is soluble in cold alcohol, and a considerable portion of the remainder in hot alcohol, and by treating it with these solvents in succession it may be separated into the following constituents:

Resinous substance, *Sycoretin*, easily soluble in cold alcohol	73
White crystalline substances, chiefly *Acetate of Sycoceryl*, $C_2 H_3 O, C_9 H_{29} O$, insoluble in cold, but soluble in warm alcohol	14
Caoutchouc, fragments of bark, sand and loss ...	13."

(Warren de la Rue and Hugo Miller, in *Watt's Dict.*, ii., 646.)

Sycoretin. When the solution in cold alcohol (which is of a pale-brown colour) is mixed with water, the sycoretin is precipitated, and may be rendered colourless by repeated solution and precipitation. Sycoretin is amorphous, white, neutral, very brittle, and highly electric. It melts in boiling water to a thick liquid, which floats on the surface. It is insoluble in water, dilute acids, ammonia and aqueous alkalies. It dissolves easily in alcohol, ether, chloroform, and oil of turpentine. It is not precipitated from its alcoholic solution by neutral acetate of lead, or acetate of copper. (*Watts' Dict.*, v., 647), where further particulars are given. See also articles "Sycocerylic Alcohol," and "Sycocerylic Ethers," p. 646, *loc. cit.*

New South Wales and Queensland.

9. **Frenela (Callitris) spp,** N.O., Coniferæ.

The trees of this genus yield Australian Sandarach in greater or less quantity. These resins are very much alike, and they all possess a pleasant aromatic odour, similar in character to, but distinctly different and more powerful, than the odour emitted by sandarach under similar circumstances. When the trees are wounded the resin exudes in almost colourless transparent beads

and tears. It has obviously high refractive power, and is much like ordinary pine resin in taste, smell, and outward appearance, when the latter is freshly exuded. When the resin is older it becomes quite hard and brittle, and if allowed to remain some time on the trees becomes of a mealy appearance on the outside. Powdered, they all make fairly good "pounce," and form an efficient substitute for ordinary sandarach.

Throughout the colonies.

10. **Frenela Endlicheri,** *Parlat.*, (Syn. *F. fruticosa*, Endl.; *F. pyramidalis*, A. Cunn.; *F. calcarata*, A. Cunn.; *Callitris calcarata*, R.Br.; *Octoclinis Backhousii*, Hill); N.O., Coniferæ, B.Fl., vi., 238. *Callitris calcarata* in Muell. Cens., p. 109.

"Black Pine." "Murray Pine." "Red Pine." "Scrub Pine." "Cypress Pine."

When fresh, it is of a yellow colour, and strikingly similar to sandarach, as it is usually found in America. It is obtainable in fairly large quantities.

Northern Victoria to Central Queensland.

11. **Frenela robusta,** var. **verrucosa,** *A. Cunn.*, (Syn. *F. verrucosa*, A. Cunn.; *F. tuberculata*, R.Br.; *Callitris tuberculata*, R.Br.; *C. verrucosa*, R.Br.); N.O., Coniferæ, B.Fl., vi., 237. *Callitris verrucosa* in Muell. Cens., p. 109.

"Cypress Pine."

A resin in larger tears than an ordinary sandarach is yielded by this tree. It yields it in considerable abundance, eight or ten ounces being frequently found at the foot of a single tree, but although this exudes naturally, the supply is stimulated by incisions.

In the *Report on Indigenous Vegetable Substances, Victorian Exhibition, 1861*, it is thus described :—" A transparent, colourless or pale-yellow body, fragrant and friable, fusing at a moderate temperature, and burning with a large smoky flame, very soluble in alcohol and the essential oils, and almost totally so in ether; turpentine at the ordinary temperature does not act upon it, nor

do the drying oils, but it may be made to combine with these solvents by previous fusion."

A sample in the Technological Museum is of a dark-amber colour, and externally possesses the dulled appearance of lumps of amber. It is the darkest resin of the genus examined by me.

Northern New South Wales and Queensland.

12. **Grevillea robusta,** *A. Cunn.*, (Syn. *G. umbratica*, A. Cunn.); N.O., Proteaceæ, B.Fl., v., 459.

" Silky Oak." (For aboriginal names, see "Timbers.")

This tree is frequently planted for ornamental and shade purposes in the colonies, but to a far greater extent in Ceylon, India, Algeria, &c. It exudes a gum resin, which I have never seen except in minute quantity in Australia, but it appears to be more abundant in India and Algeria. Cooke (*Gums and Resins of India)* thus describes it: . . . "of a vinous-red colour and but little soluble; it is said to have been obtained from this tree, which is cultivated to a limited extent in Mysore. It has a bright, shining, resinoid fracture, which it retains. It is much mixed with pieces of friable bark, to which it adheres."

In some notes (1881) on the Shevaroy Hills, India, by Deputy Surgeon-General Shortt, the following passage occurs:—"Of the plants intoduced in these hills, I have to notice a peculiarity as regards *Grevillea robusta;* one tree, which is now eleven years old, has for the last two years, during the rains, produced spontaneously each year about ten ounces of a translucent gum, which has no smell or particular taste, is of a pale-yellow colour, and mixes readily with water, when it forms a whitish-brown coloured mucilage, and, as a paste, answers all the purposes of the so-called gum arabic for adhesive purposes."

This gum-resin has been examined by Fleury (see *Journ. Pharm.* [5], ix., 479-80), an abstract of whose paper is given in *Journ. Chem. Soc.*, xlviii., 238. He describes it as yellowish-red, slightly translucent, slightly friable, and similar in appearance to cherry-gum. In water it swells a little, and slowly produces a very persistent white emulsion, which passes through all filters. It contains no starch, but gives 3 per cent. of ash. The emulsion

treated with absolute alcohol gives a copious precipitate of gum proper. When the alcoholic solution is evaporated, it gives 5.6 per cent. of a reddish, transparent resin. The gum proper is grey, and does not appear to give a true solution in water. The gum already soaked in water dissolves immediately if a little potash, lime, or potassium-carbonate be added, and the solution gelatinises under the influence of a ferric salt. This reaction is said to distinguish this product from all other known gums. The gum is lævorotatory, and has no action on Fehling's solution.

New South Wales and Queensland.

13. **Grevillea striata,** *R.Br.*, (Syn. *G. lineata*, R.Br.); N.O., Proteaceæ, B.Fl., v., 462.

"Beefwood." (For other names, see "Timbers.")

A resin from this tree has just been sent to the Technological Museum from Whittabranah, in the far-west of New South Wales. It is quite free from odour, and has a dark, reddish-brown colour. When pure, it has a bright fracture, but much of it is admixed with woody matter in a fine state of division. The warmth of the hand is sufficient to cause the resin to adhere to it. It sticks to the teeth, but is without taste. It is reduced to powder with the utmost facility, forming a dull powder. It is opaque-looking, and in appearance is most like *E. maculata* kino of any substance with which the author is acquainted. It appears to be of rare occurrence, but was abundant on two particular trees. It was so hard on them that a hammer and chisel was necessary to remove it. It appears to be a true resin, and if so, will be the first recorded, so far as he is aware, from any Proteaceous plant.

South Australia, New South Wales to Northern Australia.

14. **Myoporum platycarpum,** *R.Br.*, (Syn. *Disoon platycarpus*, F.v.M.); N.O., Myoporinæ, B.Fl., v., 7.

"Sandalwood." "Dogwood." "Sugar Tree."

The resin from this tree is used by the aboriginals as a substitute for pitch and wax; *e.g.*, they cement the stone heads of their tomahawks to the fibre which joins them to the stick forming

the handle. It forms a natural sealing-wax, and for this purpose is used by the settlers in the interior. It would certainly serve as a constituent of black sealing-wax; alone, it is too soft for long keeping.

It is usually received in small rounded lumps, weathered on the outside, and possessing a pleasant, empyreumatic odour. The lumps appear of a dark reddish-brown colour, and if the weather be not warm they fly with the slightest touch of the pestle, and are easily powdered. The resin softens even with the warmth of the hand, and if kept in a bottle the heat of an average summer day is sufficient to fuse pieces presenting fresh fractures. It has a bright, almost black fracture, showing reddish-brown at the edges. It presents some resemblance to Guaiacum (especially when this resin comes to the market in small lumps), but it is not so green in colour as the latter.

All the colonies except Tasmania and Queensland.

15. **Pittosporum undulatum,** *Vent.*, N.O., Pittosporeæ, B.Fl., i., 111.

"Cheesewood." (For other names, see "Timbers.")

This tree yields a gum-resin which easily softens in the heat of the sun, but which only appears to be obtained from wounded trees. It is viscid, possesses a powerful, and to my mind a delicious odour of a turpentiny character, which somewhat resembles that of oil of cubebs, but the odour is quite *per se*. The author has been informed that a gentleman in the Illawarra district applied this "gum" to a wound of a dog, "on account of its aromatic smell," when the wound healed "with amazing quickness in a few days."

See pages 219 and 220 for an account of some *gums* from species of *Pittosporum*.

All the colonies except South and Western Australia.

16. **Syncarpia laurifolia,** *Ten.*, (Syn. *Metrosideros glomulifera* in Muell. Cens., p. 59); N.O., Myrtaceæ, B.Fl., iii., 265. (For other synonyms, see "Timbers.")

"Turpentine Tree."

On cutting through a fruit the substance is seen to contain small globules of an orange-red resin disseminated through it. On the outside of mature fruits small tears of the resin will also be found. The resin also exudes from wounds made in the bark. It is best obtained, however, by felling a tree, when it exudes between the bark and sapwood in small drops, which may be scraped off, and the resin collected fairly continuously, and in a pure state. It is an oleo-resin, and is remarkably like Venice turpentine, both in colour (a rich reddish-brown) and in viscidity. It has a very agreeable (to the author) turpentine odour, in degree and character something between those of Venice turpentine and Canada Balsam. The native bees seem to make much use of it, as they carry it away very assiduously.

New South Wales and Queensland.

17. **Xanthorrhœa spp.**, N.O., Juncaceæ.

"Grass Trees." The resin is usually, but incorrectly, called "Grass Tree Gum."

This resin has an agreeable smell, or none at all, and is soluble in ether, alcohol, and caustic potash. Its solution in the latter, when treated with hydrochloric acid, deposits benzoic and cinnamic acids; nitric acid readily converts it into picric acid. By distillation this resin yields a light neutral oil, which appears to be a mixture of benzoic and cinnamic, and a heavy acid oil, consisting of hydrate of phenyl, mixed with small quantities of benzoic and cinnamic acids.

It yields, by oxidation with melting potash, so large a quantity of *paraoxybenzoic acid* (36 grains from 9 ounces) that it may be conveniently used as a source of that acid. The mother-liquor of the ethereal extract contains also resorcin and pyrocatechin, as well as the double compound of protocatechuic and paraoxybenzoic acids, $C_{14} H_{12} O_7, H_2 O$, first obtained from benzoin. (*Watts' Dict.*, vi., 1st Suppt. 2.)

The aborigines use it for fastening on the heads of spears, &c. It could probably be used in candle-making, for it burns by itself with a bright flame, and mixes with fat in all proportions.

As usually found in commerce, it is in very small pieces (almost powder), or else these small pieces are aggregated, forming a friable mass. In this state it is more or less impure, being mixed with soil, and fragments of the yellowish bases of the leaves. After a bush fire has passed over grass trees the heat causes the resin to run into more or less spherical masses (the author has some in his possession as spherical as if turned in a lathe), and these masses can be picked out either from the interior of the charred stump or from the ground at the place where a grass-tree once grew. Such masses present the resin in a very pure form, but collecting in this way would entail too much labour to be profitable commercially—the ordinary method being to break up the grass-tree stumps, and subject the fragments to rough winnowing and washing.

The resin ("Grass-tree Gum" it is invariably called) has a very small demand, the ordinary retail price being from fourpence to sixpence a pound in Sydney, and the wholesale price, of course, much less. It is chiefly used as a colouring for varnishes, and is used by European and Chinese workmen (chiefly the latter) to stain wood in imitation of cedar, and also by inferior French-polishers. It has been observed above that abundance of picric acid, a very powerful yellow dye, can be prepared from it. But this substance can be so cheaply made from coal-tar that the resin is not now thought of for the purpose. The result is that many storekeepers in the colonies, who eagerly bought up grass-tree gum with the view to exporting it to England, have for years past had stocks on hand, and quantities now sold have frequently been gathered, say—fifteen or twenty years.

The following is the usual method adopted for collecting grass-tree gum in Australia—the articles required are an axe, a flail, a sieve, and a sheet. The stems of the grass-trees are hacked down, broken into convenient pieces, and allowed to fall into the sheet. A stout stick or flail completes the work of disintegration. The substance is then passed through the sieve, the ligneous portions of the grass-tree for the most part failing to pass through its meshes. A gentle breeze is sufficient to winnow what has passed through the sieve, in order to render it ready for the

market; but it usually comes to Sydney having been subjected to no winnowing process.

Throughout the colonies.

18. **Xanthorrhæa arborea,** *R.Br.*, N.O., Juncaceæ, B.Fl., vii., 215.

"Grass Tree."

A sample of resin of this species in the Technological Museum is presented in large concentric masses, consisting of the remains of leaves *(in situ)*, cemented together by the resin, the resin usually being so abundantly in excess that large pieces of the pure substance are readily obtainable. The inner portion of these masses is a true mould of the caudex. Where the resin weathers it is seen to be of a liver-colour, but it readily fractures (in a very similar manner to that of gamboge), and shows a very bright surface. The colour is very pleasing, and I can only describe it as of a rich purplish-brown, inclining to crimson. It is readily reducible to a fairly fine powder, which is of a dull, burnt sienna-brown, admixed with a few dark particles.

New South Wales and Queensland.

19. **Xanthorrhœa australis,** *R.Br.*, N.O., Juncaceæ, B.Fl., vii., 116.

"Grass Tree."

The shapes which the resins of the various species of *Xanthorrhœa* assume are quite accidental. Some of these forms are described under various species, and refer to specimens which have actually been examined. The resin of this species "is found in masses of irregular globular shape, within the body of the tree, and exuding in large tears and drops near its roots. It is a dark-red, friable substance, the purer homogenous specimens exhibiting a most brilliant ruby colour when crushed into fragments; it fuses readily with the same deep colour, and exhales the characteristic odour of gum benzoin and dragon's blood under such circumstances. In many respects it resembles the last-named substance, but its solutions are less intensely red, inclining to yellow, while as a varnish, it has much more body and gloss. It is very soluble in alcohol, and in the essential oils from the eucalypts, that from the Dandenong Peppermint *(E. amygdalina)* proving an exception

Called variously "Apple Tree," "Mountain Apple Tree," "Orange Gum." "Rusty Gum." The "Toolookar" of the Queensland aborigines.

When freshly exuded, this kino has (like other *Angophora* and a few *Eucalyptus* kinos) a smell like sour wine, but more disagreeable. Even when quite freshly exuded it is exceedingly brittle. It has a bright fracture, and is of a ruby colour, with a tinge of brown. Colour of powder orange-brown. Its behaviour with water is similar to that of the preceding species.

New South Wales and Queensland.

3. **Angophora Woodsiana,** *Bail.*, (Syn. Queensland Flora, Bailey); N.O., Myrtaceæ.

This "Apple Tree" yields a brittle reddish kino, used by the settlers as a remedy in diarrhœa. (Bancroft.)

Queensland.

4. **Baloghia lucida,** *Endl.*, (Syn. *Codiæum lucidum*, Muell. Arg.); N.O., Euphorbiaceæ, B.Fl., vi., 148.

"Scrub, or Brush Bloodwood." "Nun-naia" and "Dooragan" of the aboriginals.

A blood-red sap oozes from the trunk when cut, and was obtained in the following manner in Norfolk Island:—"A knife, similar to a farrier's, is used, but stronger, fixed upon a handle four to five feet long, which enables the workman to reach high up the trunk of the tree. A perpendicular incision is made through the bark, an inch wide at the surface, but tapering to a point near the wood, and from eight to ten feet long, forming the main channel through which the sap flows to the base of the tree, where a vessel is placed for its reception; branch channels are cut on each side of the main one, leading obliquely into it, six or eight inches apart, and extending nearly two-thirds round the trunk. The sap generally flows from these channels for about twelve hours, when it is collected. The quantity produced by each tree varies; sometimes about a pint, but on an average about half that quantity. The sap forms an indelible paint, and was formerly used in the island for marking bags, blankets, and other articles." (Shepherd.)

New South Wales and Queensland.

5. **Bombax malabaricum**, *DC.*, (Syn. *B. heptaphyllum*, Cav.; *Salmalia Malabarica*, Schott.); N.O., Malvaceæ, B.Fl., i., 223.

The "Simool Tree," or "Malabar Silk-cotton Tree" (of India).

The gum (*Mocharas* or *Mucherus*) only exudes from portions of the bark which have been injured by decay or insects; incisions in the healthy bark produce nothing. It is very astringent, and is used both by Hindus and Mahometans in diarrhœa, dysentery, and menorrhagia, in doses of from 40 to 50 grains for an adult. (Dymock, *Materia Medica of Western India.*) Waring (*Pharm. of India*), however, says that this gum, or rather product of a diseased action, is incorrectly referred to this species, and that its botanical source is unknown.

Queensland and Northern Australia.

6. **Ceratopetalum gummiferum**, *Sm.*, N.O., Saxifrageæ, B.Fl., ii., 442.

"Christmas Bush." (For other names, see "Timbers.")

By well wounding the tree, or, better still, by felling a tree and cutting it into logs, there exudes a kino of exceptionally beautiful appearance. It is of a rich ruby colour, perfectly transparent, very tough, though when it has become thoroughly hard it breaks with a bright fracture. It is exceedingly astringent, sticks to the teeth, and obviously contains a large proportion of gummy matter. The author having only recently collected the substance, is unable to give further particulars in regard to it at present.

New South Wales.

7. **Eucalyptus spp**, N.O., Myrtaceæ.

Many trees yield their kino in a viscid state on tapping a gum vein in spring or autumn. Exposure to the air usually hardens it almost immediately. As a very general rule, the kinos are collected naturally exuded and hardened on the outside of the bark.

There is a great difference between various species in regard to the yield; *E. corymbosa*, for instance, producing it in the greatest abundance, while some yield it so little that it has not been recorded as having been found on them. But there is no doubt that on every species it will be found in at least minute quantity.

Wales, is soluble in water to the extent of 99.22 per cent., and yielded the author 57.76 per cent. of kino tannic acid. (*Proc. R.S., N.S W., 1887*, p. 36.) The kino of another variety, "Peppermint," yielded the author (*loc. cit.* 192) 96.06 per cent. of extract, and 58.41 per cent. of kino-tannic acid.

Tasmania, Victoria and Southern New South Wales.

10. **Eucalyptus botryoides,** *Sm.*, (Syn. *E. platypodos*, Cav.); N.O., Myrtaceæ, B.Fl., iii., 229.

"Swamp Mahogany." (For other names, see "Timbers.")

This species appears to yield but little kino. Some sent from a tree known in the Illawarra district of New South Wales as "White Gum," or "Scribbly Gum," varies in colour from pinkish to a dark ruby colour. This decidedly pink colour is somewhat unusual in kinos. It appears of a brown colour when broken up.

Victoria and New South Wales.

11. **Eucalyptus calophylla,** *R.Br.*, (Syn. *E. splachnocarpa*, Hook.); N.O., Myrtaceæ, B.Fl., iii., 255.

"Red Gum" of Western Australia.

Baron Mueller has stated that the viscid kino of this tree is obtainable in considerable quantity, and that it is soluble in cold water to the extent of 70 to 80 per cent. It appears to be one of the most abundant and useful of Eucalyptus kinos.

Western Australia.

12. **Eucalyptus corymbosa,** *Smith*, (Syn. *Metrosideros gummifera*, Soland.); N.O., Myrtaceæ, B.Fl., iii., 256.

"Bloodwood." (For other vernacular names, see "Timbers.")

This tree is as fortunate in its vernacular name as any of the Eucalypts. When freshly exuded, the kino has all the appearance of a stream of blood, and so freely does it flow that frequently the appearance of the ground at the foot of one of these trees is quite startling. The kino runs down the tree in large quantities, dries almost immediately, becoming exceedingly brittle. When freshly exuded it has a distinct smell, which, as far as I know, is characteristic, and soon recognised. It has something of a vinous odour. Much of the kino exuded becomes entangled

in the scaly porous bark of this tree, but one frequently comes upon quite a store of the substance through tapping the communication with a reservoir underneath the bark, or between the concentric circles of wood. Frequently, on felling a tree, large masses of indurated kino (always more or less admixed with woody matter) may be obtained in cavities around these circles, and the presence of gum-veins of greater or less extent is always noticeable in a log of this timber. This interior kino, although quite bright when first deposited, has frequently the appearance of a very pulverulent purplish-red hæmatite, such, for instance, as is common in the Elba mines. It readily makes an impalpable powder of a Venetian red colour, soiling everything with which it comes into contact. Such kino is very variously soluble in water, whereas the freshly exuded pure substance, which is almost of a vermilion colour frequently, and, therefore, the most brilliantly tinted of all kinos, is readily and completely soluble in cold water. It forms part of the "Botany Bay kino" of commerce, and Dr. Bancroft, of Brisbane, says that it may be administered medicinally in doses of from two to ten grains.

New South Wales and Southern Queensland.

13. **Eucalyptus eximia,** *Schauer,* N.O., Myrtaceæ, B.Fl., iii., 258.

"Mountain Bloodwood." (For other names, see "Timbers.")

This "Bloodwood" yields far less kino than *E. corymbosa,* and the product is by no means of such a brilliant colour, having a liver-coloured cast, but redder than that of *E. punctata.* It is very friable, yielding a powder of a very dark buff colour.

New South Wales.

14. **Eucalyptus globulus,** *Labill.,* N.O., Myrtaceæ, B.Fl., iii., 225.

The "Blue Gum" of Victoria and Tasmania. (For other vernacular names and synonyms, see "Timbers.")

This well-known tree is by no means an abundant yielder of kino. A sample sent to Dr. Wiesner, of Vienna, some time ago, is thus described by him:—"Readily soluble in water; solution pale reddish-yellow, slightly acid, very turbid on cooling;

on heating, becomes cool again. No gum-resin; crumbling masses of light-brownish colour."

Tasmania, Victoria and just into New South Wales.

15. **Eucalyptus Gunnii,** *Hook., f.*, N.O., Myrtaceæ, B.Fl., iii., 246.

"Cider Gum." "Swamp Gum." (For other names and synonyms, see "Timbers.")

In bulk, this kino resembles, in general appearance, that of *Angophora intermedia* It is, perhaps, a little brighter in appearance than the latter. To cold water it yields a pale orange solution, leaving a quantity of a turbid sediment of a salmon colour, in which are interspersed a few dark-coloured particles.

South Australia, Tasmania, Victoria and New South Wales.

16. **Eucalyptus hæmastoma,** *Smith*, (Syn. *E. signata*, F.v.M.; *E. falcifolia*, Miq.; and including *E. micrantha*, DC.); N.O., Myrtaceæ, B.Fl., iii., 212.

"Scribbly Gum," "Spotted Gum," "White Gum," &c. (For other vernacular names, see "Timbers.")

The specific gravity of the kino from this tree is about 1.378, and the percentage of tannin 64.51. (Staiger.) A sample from Colombo, near Candelo, N.S.W., yielded the author 95.53 per cent. of extract, and 54.12 per cent. of kino-tannic acid. *(Proc. R.S., N.S.W.*, p. 84.)

It is of a bright-ruby colour, soluble completely and entirely in cold water when fresh, characteristics it possesses in common with many other kinos, *e.g.*, *amygdalina, macrorrhyncha.* It is soluble in water, and when dried forms shining scales. They may be placed on wounds, cuts, or ulcers, with satisfactory results. (Bancroft.) It is a little gummy, and, therefore, does not powder well.

Illawarra (New South Wales) to Wide Bay (Queensland).

17. **Eucalyptus leucoxylon,** *F.v.M.*, (Syn. *E. sideroxylon*, A. Cunn.); N.O., Myrtaceæ, B.Fl., iii., 209.

"Ironbark." (For other vernacular names, see "Timbers.")

This tree is comparatively rich in kino, as much as 23 per cent. having been obtained from the fresh bark by Baron Mueller;

"the tannic acid of eucalyptus kino is not, however, equal to that of oaks and acacias in tan-power, but it can be used as a subsidiary in the tanning process, where light-coloured leather is not an object. This kino is easily soluble in water, is of slightly acid reaction, becomes turbid, but clear again on heating."

Frequently the bark of this tree is completely honeycombed, the cavities being entirely filled with kino. The blackish kino set in rows, in the light reddish-brown bark, has a beaded, granular appearance, characteristic, as far as I know, of this species. When old, this kino becomes horny and more or less insoluble. The bark (with enclosed kino) yielded the author 67 per cent. of extract to water, and 41.9 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W., 1887*, p. 38.)

Spencer's Gulf (South Australia) to Southern Queensland.

18. **Eucalyptus macrorrhyncha**, *F.v.M.*, (Syn. *E. acervula*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 207.

"Stringybark." (For other vernacular names, see "Timbers.")

Specimens of this kino from near Bombala, New South Wales, have been examined by the author. He found 97.54 per cent. of extract, and 78.72 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W., 1887*, p. 84.) The kino is of a rich ruby colour. It is readily friable, and for this reason usually appears of a dull colour, unless it has been very little handled. It reminds one somewhat of some specimens of seed-lac. It is readily soluble in water.

Victoria and New South Wales.

19. **Eucalyptus maculata**, *Hook.*, (Syn. *E. variegata*, F.v.M.; *E. peltata*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 254 and 256.

The common "Spotted Gum."

The appearance of this kino is characteristic, as is also its odour. It is of a yellowish-brown to olive colour, while its odour is difficult to describe, but readily recognised when once observed. It is one of the most friable of all kinos, perhaps ranking only second to *E. corymbosa* in that respect. This friability is assisted by its porous nature, some of it being nearly as porous as pumice,

and distinctly vesicular to the eye. It can readily be crushed between the fingers into a fine powder. It forms a yellow solution in cold water, leaving a resinoid residue of a dirty brownish colour, and much like soft toffee in appearance. On long continued digestion with water it loses its resinous texture, and almost entirely dissolves. Its solubility varies very much according to its degree of freshness. The observations of different chemists in this respect can scarcely be reconciled in the absence of information in regard to the ages of the kinos, and particulars in regard to the trees which yielded them. According to Mr. Staiger, of Brisbane, this kino contains benzoic acid in an impure state, also catechin. "Like that of *E. tesselaris*, the insoluble portion of the kino treated with ether gives up a sticky substance, and leaves behind a clear, reddish, tasteless, brittle resin, having the properties of shellac." Mr. E. Norton Grimwade (*Pharm. Journ.*, 26th June, 1886) gives an account of some experiments with this kino. He found 7.07 per cent. of volatile constituents, consisting almost entirely of water, with the merest trace of a volatile oil, "to which the peculiar aromatic odour, strongly resembling styrol, possessed by the gum, is due." The quantity of this oil obtained was only two or three drops from three-quarters of a pound of kino. Unlike Mr. Staiger, Mr. Grimwade found no trace of benzoic acid, neither of cinnamic acid. The latter adds: "I tried the gum as a varnish, employing as solvents turpentine, methylated spirit, and linseed oil; the linseed oil and turpentine, I believe, practically dissolved nothing, but the methylated spirit yielded a hard, smooth, and transparent varnish." Mr. Staiger gives the specific gravity of the kino at about 1.405, and the percentage of tannic acid at 34.97. My own experiments with kinos, from different sources, up to the present, give percentages varying between 23 and 51. Mr. Grimwade (*loc. cit.*) finds the percentage in his sample to be 10 per cent. of tannin, "closely allied, if not identical, with querco-tannic acid."

Central New South Wales to Central Queensland.

20. **Eucalyptus microcorys**, *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 212.

"Turpentine Tree," or "Tallow-wood." (For other names, see "Timbers.")

A sample in the Technological Museum has crumbled into small pieces, for the most part of the size of currants. In bulk, it looks remarkably like a parcel of uncut garnets. Owing to the friability of the kino, the bright fractures become dulled with very little friction. Colour of powder, orange-brown. It is readily soluble in water, leaving a turbid residue, which eventually dissolves. Mr. Staiger gives the specific gravity at 1.395, and the percentage of tannin 53.33.

Northern New South Wales and Queensland.

21. **Eucalyptus obliqua,** *L. Hérit.*, N.O., Myrtaceæ, B.Fl., iii., 204.

A "Stringybark." (For other synonyms and vernacular names, see "Timbers.")

Like other stringybarks, this yields a kino of a ruby colour, perfectly transparent and bright-looking, and quite soluble in water.

South Australia, Tasmania, Victoria and New South Wales.

22. **Eucalyptus odorata,** *Behr.*, N.O., Myrtaceæ, B.Fl., iii., 215.

"White Box." "Peppermint." (For botanical synonyms and vernacular names, see "Timbers.")

A dull-looking kino, very pulverulent (for a kino), forming a dark, dirty-brown powder. It is apparently not obtainable in large pieces.

South Australia, Victoria and South-east New South Wales.

23. **Eucalyptus paniculata,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 211.

"She Ironbark." (For other names and synonyms, see "Timbers.")

Fresh kino of this species is characteristic, as far as my specimens go. It resembles orange lac in appearance to a marked degree, though some fragments vary in tint to brown and garnet lac. In all cases the resinous appearance of the kino is strikingly similar to lac. It is brittle, and forms a bright powder. It dis-

solves readily in water, forming a very pale-coloured solution of a bright orange-brown colour.

New South Wales and Queensland.

24. **Eucalyptus pilularis,** *Smith,* N.O., Myrtaceæ, B.Fl., iii., 208.

"Blackbutt." (For other names and synonyms, see "Timbers.")

Specimens collected by the author so closely resemble, in outward appearance, the kino of *E. piperita,* as scarcely to be distinguished from it. It dissolves readily in water, forming a comparatively pale solution.

Victoria to Queensland.

25. **Eucalyptus piperita,** *Smith,* (Syn. *E. acervula,* Sieb.); N.O., Myrtaceæ, B.Fl., iii., 207.

"Blackbutt." "Messmate." "Narrow, or Almond-leaved Stringy-bark." (For other vernacular names, see "Timbers.")

This is another kino of the *E. amygdalina* type. It can be procured in fairly large quantities. It yielded the author 99.75 per cent. of extract to water, and 62.12 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W., 1887,* p. 192.)

Gippsland, New South Wales and Queensland.

26. **Eucalyptus Planchoniana,** *F.v.M.,* N.O., Myrtaceæ, F.v.M., Fragm., xi.

"This kino is of very great astringency, and, therefore, particularly valuable for therapeutic purposes; after adherent impurities are removed by alcohol it is found to be composed mainly of kino-tannic acid, the percentage being 93.88 of that acid, the rest (6.12) consisting simply of real gum, and seems quite free of gallic acid." (Mueller, *Eucalyptographia.*)

New South Wales and Queensland.

27. **Eucalyptus punctata,** *DC.;* N.O., Myrtaceæ, B.Fl., iii., 244.

"Grey Gum" and "Leather-jacket." (For other names and synonyms, see "Timbers.")

This kino, especially when in large masses, somewhat resembles Hepatic Aloes in appearance, but it is far more brittle than that substance, crumbling without much difficulty by pressure of the fingers. Its colour may be described of a very dark brown,

with a slight orange tint, and comparing it with still another substance, one from the mineral kingdom, it is much like some of the Melanite garnets from Franklin, New Jersey, U.S.A. The powder is of an ochre colour, slightly more brown than "Oxford ochre." When freshly collected it has a vinous odour, somewhat similar to, but less powerful than that of *E. maculata*. The author happened to tap a reservoir of this kino at the base of a tree, which was as fluid as molasses at first, but on a few minutes' exposure to the air it hardened and became quite brittle. On treatment with cold water the bottom layer of liquid is of a rich reddish-brown, the rest of the liquid becoming, by diffusion, of the colour of olive oil. There is abundant sediment, which powders readily, of a light buff colour, forming a turbid liquid.

New South Wales.

28. **Eucalyptus resinifera,** *Smith*, (incl. *E. spectabilis*, F.v.M.; *E. pellita*, F.v.M.; *E. Kirtoniana*, F.v.M.; *E. hemilampra*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 245.

"Jimmy Low." "Red, or Forest Mahogany." (For other vernacular names, see "Timbers.")

In most English books the bold statement is made that "Botany Bay kino is the produce of *E. resinifera*;" this species is not intended, but *E. siderophloia*, one of whose synonyms is *E. resinifera* (A. Cunn). Unless, however, special pains have been taken to diagnose the species yielding a kino, the name *E. resinifera* must be only understood generically, for there are scores of species of Eucalyptus which yield kino as abundantly, or more abundantly than either *E. resinifera*, Smith or A. Cunn. Authenticated kino of this species is all but unknown to science. A small quantity in my possession is in smallish tears for the most part, and invariably showing firmly adherent wood and bark on one side. It is clear looking, and exhibits a dark ruby colour by transmitted light. It has, however, been collected for a considerable time. It is inclined to be tough and horny, though it has a bright fracture; colour of powder, burnt sienna. It dissolves in water, forming a clear solution. Mr. Staiger gives the specific

gravity of a sample of this kino at about 1.416, and the percentage of tannin 65.57.

New South Wales and Queensland.

29. **Eucalyptus rostrata,** *Schlecht.*, (Syn., *E. longirostris*, F.v.M.; *E. acuminata*, Hook.; *E. brachypoda*, Turcz. non Benth.; *E. exserta*, F.v.M.); N.O., Myrtaceæ, B.Fl. iii., 240.

"Red Gum." "Flooded Gum." (For other vernacular names, see "Timbers.")

Thanks to the enterprise of Mr. Bosisto, of Melbourne, this kino is probably the best known of all Eucalyptus kinos to European and Australian medical men. Mr. Bosisto describes it as a delicate mucilaginous astringent, which also possesses tonic properties, employed with benefit in affections of the mucous membrane of the stomach and bowels, and a reliable remedy in the treatment of chronic dysentery and diarrhœa. As a topical astringent for the uvula and tonsils, either in the form of a gargle, syrup, or lozenge, it forms a useful remedy. But the statement, "none approaches it in value for medicinal purposes," may or may not be literally true, or perhaps it only refers to Victorian species, for of Australian kinos in general, our knowledge is of the most elementary and empirical description.

Mr. Bosisto's extract is freed from insoluble matter, whether consisting of old kino (kinos all tend to insolubility with age), or accidental impurity, and is an elegant preparation.

Kino of this species, when quite fresh, is quite soluble in cold alcohol and cold water.

South Australia to Northern Queensland.

30. **Eucalyptus saligna,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 245.

"Grey Gum." "Blue Gum." (For other vernacular names, see "Timbers.")

The author has very rarely seen this kino. A sample he collected is dullish-looking, and of all tints of garnet. It is of horny consistence for the most part, and in bulk it perhaps most generally resembles that of *E. punctata* in appearance, but it has none of

the brown tint of the latter. It readily dissolves in cold water, forming a perfectly clear liquid of an orange-brown colour.

New South Wales and Queensland.

31. **Eucalyptus siderophloia,** *Benth.*, (Syn. *E. resinifera*, A. Cunn., non Smith; *E. persiciflora*, DC.; and probably *E. fibrosa*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 220.

"Ironbark." (For other vernacular names, see "Timbers.")

See *E. resinifera*, Smith. A certain amount of the "Botany Bay kino" of commerce was formerly obtained from the present species, hence Allan Cunningham and other botanists were accustomed to call it *E. resinifera*, a term now loosely applied to Eucalyptus kinos in drug lists.

When new, it is of a rich ruby colour, both by reflected and transmitted light. It is mostly in tears, inclined to be horny or gummy, and, therefore, somewhat difficult to powder; colour of powder, sienna-brown. It dissolves almost entirely to a light orange brown liquid.

Some bark of this tree (with adherent and apparently very old kino) was examined by the author (*Proc. R.S., N.S.W.*, *1887*, p. 39), with the following results:—(*a*) Bark with adherent kino yielded 68.1 per cent. of extract, and 26.48 per cent. of kino-tannic acid. (*b*) Bark freed from kino yielded 26.56 per cent. of extract, and 10.4 per cent. of kino-tannic acid. (*c*) Kino alone, extract 97.56 per cent., and kino-tannic acid 35.1 per cent.

Southern Queensland to Port Jackson.

32. **Eucalyptus Sieberiana,** *F.v.M.*, Syn. *E. virgata*, (the species name in B.Fl.); N.O., Myrtaceæ, B.Fl., iii., 202.

"Cabbage Gum" of the Braidwood district of New South Wales. "Mountain Ash." (For other vernacular names, see "Timbers.")

This kino is one of the most soluble of the Eucalyptus kinos. The slightest shower of rain softens it on the trees. It is of a rich garnet colour. It is rather tenacious to powder, yielding a dull, orange-coloured powder. This kino, as taken from the trees, has very much the appearance of ribbon gum kino (*E. amygdalina* var.), except that perhaps it is a shade duller in colour, but the difference between them is perceptible immediately each is tapped

with the pestle, the large pieces of *E. Sieberiana* kino readily becoming dulled by a coating of their own powder. It is readily soluble in cold or hot water.

Tasmania, Victoria and New South Wales.

33. **Eucalyptus stellulata,** *Sieb.*, N.O., Myrtaceæ, B.Fl., iii., 200.

"Sally," or "Black Gum." (For botanical synonyms and vernacular names, see "Timbers.")

This kino very much resembles in appearance that of *E. Sieberiana*. It fractures readily, forming angular, bright garnet grains, but it is too tenacious to powder well. It is exceedingly astringent. It yielded the author 62.96 per cent. of tannic acid, and it is practically entirely soluble in water, the author having found it soluble to the extent of 99.22 per cent. (*Proc. R.S., N.S.W., 1887, p. 191.*)

Victoria and New South Wales.

34. **Eucalyptus Stuartiana,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 243 (partly).

"Turpentine Tree." "Apple-scented Gum." (For synonyms and other vernacular names, see "Timbers.")

Mr. Bäuerlen, who collected a quantity of this kino for the Technological Museum on the borders of New South Wales and Victoria, gave me the following scrap of information. Some ladies who saw him thus employed assured him that they knew of nothing which cleanses the teeth so quickly and effectually as this kino. Its friability, combined with its astringency, have doubtless given it this reputation.

It is a comparatively dull-looking kino, having somewhat the appearance of seed-lac, and the particles are equally variable in point of colour. It is exceedingly brittle, forming a powder of a dull sienna-brown. It only partially dissolves in water, forming abundant sediment of an ochrey-brown colour.

Tasmania to Queensland.

35 **Eucalyptus tereticornis,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 241.

"Grey Gum," "Bastard Box," etc. (For other names and synonyms, see "Timbers.")

This is the dullest looking kino the author has ever seen. Its general colour is brown; it can readily be reduced to a fairly fine powder between the fingers. It forms a light reddish-brown turbid liquid, leaving a muddy-looking residue of a salmon colour, evidently composed of finely divided particles of resin, wood, and a gelatinous substance. The last portions of soluble matter are exceedingly tedious to extract.

Victoria to Queensland.

36. **Eucalyptus terminalis,** *F.v.M.*, (Syn. *E. polycarpa*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 257.

"Bloodwood." (See also "Timbers.")

This tree is for the most part sparsely distributed, and then on rivers and creeks; also, very few trees exude kino, and then only in small quantities. A small sample in the Technological Museum has quite freshly exuded. It is in very small fragments, with attached bark. It is of a pale ruby colour, and very bright looking; colour of powder, dark salmon; it can readily be crushed by the fingers. With water it forms a pale orange-brown liquid, with a light brown sediment.

South Australia, New South Wales to Northern Australia.

37. **Eucalyptus tesselaris,** *Hook.*, (Syn. *E. viminalis*, Hook. f.; *E. Hookeri*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 251.

"Moreton Bay Ash." (For other vernacular names, see "Timbers.")

This kino has the property of exuding of a dark brown treacle-colour, and soon becoming black without any tint of red. According to Mr. Staiger, it has a specific gravity of 1.35, and contains 71.7 per cent. of matter soluble in boiling water, and on cooling the solution becomes turbid, and deposits catechin. The portion insoluble in water is soluble in alcohol, and the residue, when treated with ether, leaves a dark coloured brittle mass identical with shellac, possessing the same qualities, both technically and chemically, and giving a good French-polish of a rather darker colour than the usual commercial article. This shellac constitutes about one-fifth of the entire gum; it is insoluble

in benzine, kerosene, and the essential oils. The portion dissolved by ether forms a pliable, reddish, transparent mass, which does not become dry, even after four or five days. (Bancroft.)

South Australia, New South Wales to Northern Australia.

38. **Eucalyptus trachyphloia,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 221.

"The analysis of one sample of kino gave us as much as 73 per cent. of kino-tannic acid (soluble in water and alcohol, and precipitable by acetate of lead out of an acidified solution), 18½ per cent. kino-red or allied substance (insoluble in water, but soluble in alcohol), 8½ per cent. gum and pigment (soluble in water, and partly in alcohol, but not precipitable by acetate of lead"). (Mueller, *Eucalyptographia.*)

39. **Eucalyptus viminalis,** *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 239.

"White Gum," etc. (For other names and synonyms, see "Timbers.")

A sample in the Technological Museum is in small fragments, and the prevailing colour, ruby, of all depths of tint. It is bright-looking, and easily reducible to a powder between the fingers; colour of powder, light orange-brown. In water, it forms a solution of an orange-yellow colour, something like linseed oil. The muddy residue is of a palish salmon colour.

Tasmania, South Australia, Victoria and New South Wales.

OILS:

A. (VOLATILE OR ESSENTIAL.)

1. **Andropogon Schœnanthus,** *Linn.* (Syn., *A. Martini,* Roxb.; *A. citratum,* DC.; *Cymbopogon Schœnanthus,* Spreng.); N.O., Gramineæ, B.Fl. vii., 534.

This sweet-scented grass is distilled in India, and yields the fragrant, often adulterated Rusa or Citronelle oil of commerce, one of the "Grass" or "Verbena" oils. In one experiment Dr. Dymock obtained 1lb. 5½ozs. of oil from 373lbs. of grass. It is much used by the Arabs and Turks as a hair-oil.

Queensland.

2. **Angiopteris evecta,** *Hoffm.;* N.O., Filices, B.Fl. vii., 694.

This plant yields an aromatic oil, said to be used in the South Sea Islands for perfuming cocoa-nut oil. (Woolls.)

Queensland.

3. **Atherosperma moschata,** *Labill.;* N.O., Monimiaceæ, B.Fl. v., 284.

"Native Sassafras."

The oil obtained by aqueous distillation from the bark is thin, unctious, pale-yellow when fresh, but becomes yellowish-brown with age. (That obtained from the leaves is a distinct essential oil, is of a greenish colour, and resembles oil of mace. It requires further examination. Bosisto.) It resembles, in odour, ordinary sassafras oil, with an admixture of oil of caraways. The taste is aromatic, bitter, and prickly to the tongue. Sp. gr. 1.04. Boils at 230° to 245°. *(Report of the London Exhibition of 1862.)*

One hundred pounds of the bark yielded, in one case, 18oz. 6dr. of the oil.

In large quantities it must be regarded as a dangerous poison. Rubbed externally upon the skin it does not, like myrtaceous oils, act as a rubefacient or irritant.

An extract of this bark is preferred medicinally, as the essential oil is said to have a lowering effect on the heart. The latter is, however, given in certain circumstances, in doses of one or two drops.

Oil of *Atherosperma moschata.*

Specific Gravity at 15.5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
1.0425	14°	1.5172	1.5274	1.5628	+7°

These determinations were made by Dr. Gladstone. The rotatory power was determined for a column of liquid 10 inches long (*Watts' Dict.*)

Tasmania, Victoria and New South Wales.

4. **Backhousia citriodora,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 270.

The dry leaves yield a slightly acid essential oil of specific gravity .887. (Staiger.) By age it becomes yellowish and resinous. (Bancroft.) In the report of Messrs. Schimmel & Co., Dresden, (*Pharm. Journ.*, 28th April, 1888), the following statements are made in regard to this oil: "Sp. gr., .900; boils from 223° to 233°. Both these oils (*Eucalyptus Staigeriana* is also referred to) are distinguished by an intense odour of lemon or verbena, and for the *Backhousia* oil especially, there is probably a future. The most important constituent of the two oils is a ketone (C_{10} H_{16} O ?) with a strong, pure, lemon odour. The oil of *E. Staigeriana* contains a considerable quantity of a terpene, whilst that of *Back-*

housia citriodora appears to consist principally of the previously mentioned ketone."

Queensland.

5. **Eucalyptus spp.**, N.O., Myrtaceæ,

"Eucalyptus Oil."

The remarks which appear in journals in regard to experiments with Eucalyptus oil do not allude, as a very general rule, to the oil of any particular species of Eucalypt. The oils from some of the commonest species appear to be more or less similar, but there are most important differences between some of them, and each will be described under its species-name. The following preliminary remarks apply to Eucalyptus oils in general. See also remarks under the head of "**Eucalyptus.**" ("Drugs.") Eucalyptus oil is only obtained, in practice, from the leaves; (it is also contained in the flower-buds.) In Payen's *Industrial Chemistry* (Paul), p. 724, it is said to be obtained in part from the flowers. This is scarcely correct, except as a theoretical source.

Robert has made a number of experiments with Eucalyptus oil, and comes to the conclusion that it possesses the power to destroy bacteria or animal life, and can well be classed with antiseptics. In order to test the properties of volatile antiseptics on animal life found in decomposing liquids, he made a number of experiments with an infusion of hay-seeds placed in a bottle and exposed to the atmosphere; in the course of a few days the liquid became turbid and slimy, but if a few drops of the oil of Eucalyptus were added the liquid remained clear. The oil being volatile, some micrococci were exposed to the vapour, the action of which caused a destruction of the animalcules. Some surgeons 'have employed a spray of Eucalyptus oil during operations, thereby destroying every possibility of germs entering from the surrounding atmosphere; the wound is then dressed in the ordinary manner, and the results have been very promising. (*Med. Chirurg., Cent. blatt.*)

As an antiseptic, it has the advantage over carbolic acid that it is not caustic; also, it is more than three times as powerful as that substance in preventing the development of bacteria; and is,

moreover, not so poisonous. Eighty minims may be taken in two and a half hours. (*Practitioner*, xxv., 212.)

Air impregnated with Eucalyptus oil vapour is recommended as a substitute for the carbolic spray. (*British Medical Journal*, ii., 1882, 420.)

As a surgical dressing, gauze dipped in a solution of the oil 3, alcohol 15, and water 150. This gauze may be left undisturbed four or five days. (*Lancet*, ii., 1880, 387. See Martindale and Westcott's *Extra Pharmacopœia*.)

Therapeutic Action. "In considering the medicinal effect of the oils of Eucalyptus, it must be remembered that we are dealing with bodies of simple composition, and, consequently, different from those complex compounds of the type of the well-known energetic poisons.

The hydrocarbon character of the Eucalyptus oils, together with their low specific gravity, varying from 0.880 to 0.911, points to their rapid diffusibility when taken internally. Analogous compounds, such as camphor, alcohol, and conia, afford the key to their action. The immediate effect of each of the bodies just named is well known to be on the cerebro-spinal nervous system; any one of these taken in large doses produces more or less complete flaccidity of the muscular system, and ultimately produces a state of inebriation and unconsciousness; a similar result follows extreme doses of Eucalyptus oil. Medical men report that a small dose promotes appetite; a large one destroys it. In stronger doses of 10 to 20 minims, it first accelerates the pulse, produces pleasant general excitement (shown by irresistible desire for moving about), and a feeling of buoyancy and strength. It is intoxicating in very large doses, but, unlike alcohol or opium, the effects are not followed by torpor, but produce a general calmness and soothing sleep. The antidote for an overdose is also alike in character, viz., a strong cup of coffee, without milk or sugar, which speedily removes any alarming symptoms. Now these results, as compared with the medicinal action of *Conium maculatum*, are very striking—an overdose of this drug leaves the intelligence and sensory system intact, while it paralyses the motor system; overdoses of Eucalyptus produce similar results.

The bitterness left on the palate after taking Eucalyptus oil is evidently due to a principle isomeric with the oil, not separable. It is probably in the active agent, so often referred to by medical writers when urging the anti-periodic properties of the oil." (*Therapeutic Gazette.*)

Dr. Leighton Kesteven (*Practitioner*, May, 1885) used Eucalyptus oil methodically in an epidemic of typhoid fever. The doses were at first two to five drops, made into an emulsion of mucilage, but latterly he employed 10 minims every four hours. In cases in which the drug does not agree with the stomach, careful emulsification and the addition of half a drachm each of aromatic spirits of ammonia, spirits of chloroform, and glycerine, will often remove the nauseous taste. Dr. Kesteven reports that in 220 cases treated in 18 months he only had four deaths.

Dr. J. H. Mussen, of Philadelphia, furnishes a paper to *The Therapeutic Gazette*, of July, 1886, "On the Value of Oil of Eucalyptus in some Malarial Affections." The following are his conclusions:—

1. That the oil of Eucalyptus is of decided value in about one third of all cases of intermitting malarial fever.

2. That it has no specific value in any one type of the disease.

3. That the longer the duration of the disease, the less likely it is to do good.

4. That relapses are not prevented by it.

5. That its influence on the spleen has not been demonstrated.

6. That a dose of five drops four times daily has been a sufficient dose, but that five drops every three hours would be of greater value possibly.

7. That good results are not attained as quickly as by large doses of quinine, but that a good effect should be noticed within five days at least.

An emulsion may be made by putting equal quantities of gum arabic and the oil into a dry bottle, adding 40 parts of water, more or less, and shaking well. This is useful, for example, as a urethral injection or lotion, and may be given internally in one to four drachm doses.

Eucalyptus oil in general is employed, usually mixed with an equal quantity of olive oil, as a rubefacient in cases of rheumatism, lumbago, sciatica, chronic hepatitis, asthma, bronchitis and sprains. It is also an anthelmintic, 30 to 60 minims being injected *per anum* in mucilage of starch. It has been successfully used in the treatment of diphtheria, not that it possesses any specific action in this disease, but "in its local action it seems to be all that can be desired."

It has also been recommended for deodorising iodoform and other drugs. It has been largely used in gynæcological practice in America, with good results.

In diphtheria, a mixture of 5 grammes of oil, 25 grammes of rectified spirit, and 170 grammes of water used for 10 inhalations, or equal parts of the oil and rectified spirit, of which 10 to 60 drops were used for an inhalation. (*Medical Times and Gazette*, ii., 1879, 214. See also *Lancet*, ii., 1883, 362.)

In gynæcological practice pessaries, composed of six drachms of Eucalyptus oil, and four drachms each of oil of theobroma and white wax divided into twelve, one night and morning, or at night only, found useful after parturition, checks fetor and decomposition of lochial discharge; and five minims of Eucalyptus oil mixed with 20 of olive oil, used and recommended as a hypodermic injection for pyæmia. (*Lancet*, ii., 1882, 343, quoted by Martindale and Westcott.)

The following preparation is to be found in the *British Pharmacopœia* (1885) :—

"*Oleum Eucalypti* (oil of Eucalyptus).

The oil distilled from the fresh leaves of *Eucalyptus globulus* (Labill.), *Eucalyptus amygdalina* (Labill.), and probably other species of Eucalyptus.

Characters and Tests. Colourless, or pale straw-coloured, becoming darker and thicker by exposure. It has an aromatic odour, and a spicey and pungent flavour, leaving a sense of coldness in the mouth. It is neutral to litmus paper. Specific gravity about 900. Soluble in about an equal weight of alcohol. *Dose*, one to four minims. *Preparation*, Unguentum Eucalypti.

Ungentum Eucalypti. Ointment of Eucalyptus. Take of

Oil of Eucalyptus, by weight, 1 ounce, or 1 part.

Soft Paraffin } of each ... 2 ounces, or 2 parts.
Hard do. }

Melt the hard and soft paraffins together, add the oil, and stir until cold."

The following preparations in which Eucalyptus oil is the active ingredient, are taken from the *Extra Pharmacopœia* of Martindale and Westcott:—

Eucalyptus gauze (Carbasus Eucalypti). In 6-yard pieces. Unbleached cotton gauze, impregnated with

Oil of Eucalyptus	1
Dammar Resin	3
Paraffin	3

An antiseptic surgical dressing. In using it there is no danger of poisonous absorption of the antiseptic, as with carbolic acid gauze. (*Lancet*, i., 1881, 828; *B.M.J.*, i., 1881, 850.)

Iodoform and Eucalyptus Bougies (Cereolus Iodoformi et Eucalypti)—

Iodoform, precipitated	5 grains.
Oil of Eucalyptus	10 minims.
Oil of Theobroma	35 grains.

To make one bougie 4 inches long. Used to arrest gonorrhœa.

Unguentum Iodoformi et Eucalypti—

Iodoform	60 grains.
Oil of Eucalyptus	1 ounce.

Heat gently till dissolved, and add to

Paraffin	2½ ounces.
Vaseline...	2½ ounces.

Melted together. Stir till cold.

Eucalyptol ($C_{12}H_{20}O$) is contained in large quantity in the oils of some species of *Eucalyptus*. It is not present in *E. amygdalina*, but *E. globulus* contains it abundantly. The crude oil contains also a number of products boiling between 188° and 190° and about 200°, the Eucalyptol being contained in the portion which passes over between 170° and 178°, from which it may be obtained pure

by contact, first with solid potassium hydrate, then with calcium chloride, and subsequent distillation.

Eucalyptol boils at 175°, has a specific gravity of .905 at 8°, and turns the plane of polarization to the right. Its molecular rotatory power is 10.42° for a length of 100 mm. It is slightly soluble in water, and dissolves completely in alcohol; the dilute solution has an odour of roses. Vapour density observed =5.92, calculated =6.22. Ordinary nitric acid slowly attacks Eucalyptol, forming, among other products, an acid probably analogous to camphoric acid. Strong sulphuric acid blackens Eucalyptol, and water separates from the product a tarry body which yields by distillation a volatile hydrocarbon.

Eucalyptol heated with phosphoric anhydride gives up water, and yields *Eucalyptene* (*q.v.*). At the same time there is formed another liquid, *Eucalyptolene*, which has the same composition, but boils above 300°.

Eucalyptol absorbs a large quantity of dry hydrogen chloride, the liquid first solidifying to a crystalline mass, which, however, afterwards liquefies, with separation of water, and formation of a body apparently identical with Eucalyptene. (Clöez, in *Watts' Dict.* ii., *Suppl.*, p. 492.)

Later experiments by Faust have, however, modified those of Clöez, above described, inasmuch as the body called *Eucalyptol* has been found to be a mixture of about 70 per cent. of *Eucalyptene*, and 30 per cent. *cymene*. After rectification over sodium, it boils between 171° and 174°. It dissolves in all proportions in absolute alcohol, ether, and chloroform, and in about 15 parts of 90 per cent. alcohol; has the odour of a fine terpene; detonates with iodine; absorbs oxygen with avidity; turns brown with strong sulphuric acid, and is converted by oxidation with dilute nitric acid into paratoluic and terephthalic acids.

The Eucalyptene and cymene contained in Eucalyptol cannot be separated by fractional distillation. To obtain the cymene, the mixture was shaken with sulphuric acid diluted with one-fourth part of water, and then heated, whereby the Eucalyptene was polymerised; then, after three days, the liquid was mixed with water and distilled, whereby a distillate was obtained, consisting of

cymene, which, after repeated rectification over sodium, boiled at 173° to 174°.

The camphoroidal body, $C_{10}H_{16}O$, is a colourless oily liquid which becomes faintly yellowish on exposure to light, boils at 216° to 218°, is insoluble in aqueous potash, and yields cymene when distilled with phosphorus pentasulphide. Its analysis gave numbers intermediate between those required by the formulæ $C_{10}H_{14}O$ and $C_{10}H_{16}O$, but the reactions of the body show that it is not an oxycymene. (*Watts' Dict.*, 3rd Suppt., Part i., p. 761.)

Eucalyptol is employed as a therapeutic agent in diphtheritic and bronchial affections. About one teaspoonful, with half a pint of water, is placed in the inhaler. It is also administered internally in mucilage, syrup, or glycerine, the dose being from three to five drops in those vehicles.

Eucalyptene (see "Eucalyptol").

Oppenheim and Pfaff have examined Eucalyptus oil (probably obtained from *E. odorata* and *E. amygdalina*). By repeated treatment with potash, washing with water, and fractionation, it yielded *Eucalyptene* ($C_{10}H_{16}$), boiling at 172—175° and having a vapour-density of 68.55 and 68.22 (calc. 68, H=1). This hydrocarbon did not form a crystallised compound with hydrochloric acid, or yield a crystallised hydrate when left for six months in contact with nitric acid and alcohol. When treated with half the calculated quantity of iodine it was converted into *cymene*, $C_{10}H_{14}$, which, when oxidised with dilute nitric acid, yielded paratoluic acid, melting at 173°—175°. The crude oil did not yield any oxidised compound answering to the Eucalyptol of Clöez. (*Watts' Dict.*, 3rd Suppt. Pt. i., p. 761.)

Algeria and California are now powerful competitors with Australia in the production of Eucalyptus oil. It is affirmed that Algeria alone is now in a position to supply the whole world with *Eucalyptus globulus* oil, and that a large quantity is available from California, where it is produced as a bye-product in the manufacture of anti-calcaire preparation for boilers. The production of Eucalyptus oil appears, moreover, to be increasing in Australia, where it has spread from Victoria* to South Australia, whilst in

* Eucalyptus oil is distilled in quantity in New South Wales.

Tasmania, also, a company has been formed for the distillation of different species of *Eucalyptus*. A statement made in a previous report that the Australian oil from *Eucalyptus amygdalina* contains no Eucalyptol, and is inferior in this respect to the *Eucalyptus globulus* oil from Algeria and California, was subsequently challenged and stigmatised as "distinctly erroneous." Messrs. Schimmel, however, now reaffirm that statement, and say that the fraction of the *amygdalina* oil, separable at a temperature of 176°-177°C, has a specific gravity of 0.886 at 15°C (Eucalyptol has a specific gravity of 0.930), and is probably a mixture of terpene (Eucalyptene, $C_{10}H_{16}$) and a small quantity of cymol." (*Pharm. Journ.*, 1888.)

The following excerpt from the *India-rubber and Gutta-percha Journal*, 1887, on the subject of Eucalyptus leaves for preventing and removing scale in boilers is interesting, and may perhaps be mentioned under this head, pending the settlement of the question as to what constituent or constituents in the leaves causes the action stated. The matter is worthy of consideration by steam-users in Australia, to whom illimitable supplies of gum leaves are available for experiment.

"Boiler cleaning is an important subject to all users of steam power. The extract from the leaves of the *Eucalyptus*, or blue gum (which has recently been found so efficacious for the above-named purpose), is procured by boiling the leaves in a battery of boilers under a pressure of 40lb. of steam. Twenty tons of leaves are boiled every day, and the boilers, after constant use of two years, are as sound as when they came from the shop. Extract of *Eucalyptus globulus*, or blue gum, has been tested by Professor E. W. Hilgard, of the Agricultural Department of the University of California, in respect to its contents of tannin, its taste being highly astringent. It was found that a standardised tannin solution would precipitate ·337 per cent. only of tannin; that beyond these limits either tannin or gelatine solution would produce a precipitate of about equal amount. After removing the tannin as far as possible, by digestion with animal membrane, the acid reaction shown by the extract was found to be equivalent to only ·127 per cent. of sulphuric acid, an amount so small that

it is doubtful whether the cleansing action upon the boilers can be attributed to acid in solution. In most instances scale will be lessened during the first application, but in others, where the scale is hard, it does not begin to move for six weeks or more. The extract does not act suddenly on the scale, but on close observation good results will be immediately seen. The liquid may be put in through the manhole, feed-pipe, safety-valve, condenser, or hot-well. After it is put in no new scale will form, and the iron will cease to rust."

6. **Eucalyptus amygdalina,** *Labill.;* N.O., Myrtaceæ, B.Fl. iii., 202.

"Peppermint." "Mountain Ash." (For the numerous botanical synonyms and vernacular names of this tree, see "Timbers.")

This species is far richer in oil than any other Eucalypt, the average yield from the leaves being demonstrated by Mr. Bosisto at about 3 per cent. The distilled oil is pale-yellow, thin, of rather pungent cajeput-like odour, resembling, but coarser than, lemons; of a cooling, but afterwards bitter taste, of specific gravity at 15°, .881 (later experiments give .856 for rectified, and .865 for non-rectified), boiling point 329° to 370°F., and it deposits stearoptene at low temperatures (18° which melts at 3°). It dissolves gutta-percha readily, and may be used in lamps like petroleum, with the important advantages of greater illuminating power, pleasant odour, and non-liability to explosion, but it is much more expensive than the latter. (Mueller.) Some of this oil was exhibited at the London International Exhibition of 1862. The price quoted was six shillings per gallon, and the jurors proceed to remark:—"Three ounces of the oil were sufficient to scent very strongly eight pounds of soap, at a cost of about one farthing per pound. The perfume produced by this oil alone would, however, be considered by some more peculiar than agreeable, and we obtained a much better result by combining it in a second experiment with oils of cassia, cloves, and lavender, which mixture yielded a very pleasant fragrance."

The "Oil of Eucalyptus" in general use, is frequently obtained from *E. amygdalina*, and not from *E. globulus*, being more

abundant, much cheaper, and containing the usual remedial properties assigned to Eucalyptus oil. It is very fluid, almost devoid of colour, has a persistent and camphoraceous odour, is slightly soluble in water, but completely so in alcohol, oils, fats, and paraffin. It is not caustic, like carbolic acid, nor does it produce much irritation of the skin, unless applied with extreme friction; in that case the application of an emollient will speedily give relief. It is very destructive to low organic growth. It is a powerful antiseptic, and by some practitioners stated to be more than three times as strong as carbolic acid in preventing the development of bacteria. Its uses are manifold.

Messrs. Schimmel & Co., Dresden, state that this oil differs from all other Eucalyptus oils known to them, and contains, probably, scarcely any oxygenated constituents; it more likely consists of at least one well-characterized terpene ($C_{10}H_{16}$), and possibly a small quantity of cymol. Its specific gravity is 0.890; it boils practically between 170° and 180°, and is lævogyre. Observations on three different samples, gave, in a 100 mm. column, a rotatory power of 27°, 28.4°, and 28.6°; consequently, this property allows of it being easily distinguished from the dextrogyre oil of *E. globulus*. (*Pharm. Journ.*, April, 1888.) Messrs. Schimmel also allege, that in consequence of this oil having been proved to contain no Eucalyptol, the demand for it has fallen off.

The following essential oil is described as from *E. fissilis*, a variety of *E. amygdalina*: Pale, reddish-yellow oil, of 0.903 sp. gr.; boils at 177° to 196°. (Wittstein and Mueller.)

Speaking of Eucalyptus oils, Mr. Bosisto says: (*Pharm. Journ.*) "People in England would always speak principally of *E. globulus*, but the fact is that it is considered in Australia to be the worst of the whole lot." Now the incorrect labelling of shipments from Australia has much to do with this practice, but it is hoped that scientific people throughout the world will use the correct species-name when they are able to do so.

Mr. Leopold Field, the soap-maker (at a meeting of the Pharm. Soc., at the close of the Colonial and Indian Exhibition), said the oil they always obtained came to them in iron tins holding about 56lbs., and it was labelled *E. globulus*, and sometimes, by

way of a change, *E. amygdalina*, for the two things seemed exactly the same. They had had one sample of *E. dumosa* oil, which was vastly superior, and they had tried to get it again and again, but had never succeeded in getting a similar oil. The various Eucalyptus oils were of great interest to the soap-maker. *E. citriodora* oil was a very interesting substance, and might, if worked into soap, give the public very great satisfaction, inasmuch as the odour appeared to be pleasanter than lemon-grass, and not so sickly as that of citronelle. All the odours the various Eucalypti were capable of assuming had the peculiar property common to camphoraceous odours, and no doubt the soap-maker would be able to utilize them largely.

Oil of *Eucalyptus amygdalina*.

Table (1).

Specific Gravity at 15·5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
.8812	13.5°	1.4717	1.4788	1.5021	—136°

These determinations were made by Dr. Gladstone. The rotatory power was determined for a column of liquid 10 inches long.

Table (2).

Specific gravity at 20° C.	Boiling Point.	Refractive Index A at 20° C.	Dispersion at 20° C.	Sensitiveness.	Specific Refractive Energy.	Rotation.
.8642	171°	1.4696	.0323	49	·5434	—142°

(Gladstone, *vide Watts' Dict.*, iv., 186.)

South Australia, Tasmania, South and East Victoria, coastal districts of New South Wales (not extending far to either west or north).

becomes resinous on exposure to the light. The word "globulus" is taken by many dealers in Eucalyptus oils (in and outside the colonies) to be generic, so that many other oils of different species of Eucalyptus are sold as if they were the product of *E. globulus.*

In *Watts' Dict.*, 3rd Suppt., Part i., p. 61, it is stated that Faust has found that this oil contains a terpene boiling at 150°-151°, another terpene called *Eucalyptene* boiling at 172°-175°, together with *cymene*, and a camphor-like body, $C_{10} H_{16} O$. The terpene boiling at 150°-151° is present in small quantity only; it takes fire with iodine, and resinises on exposure to the air. (See the remarks on "Eucalyptus oils" at the commencement of this genus.)

"The oil obtained in a first distillation corresponded in its general properties with the commercial French and Californian* distillates, but the distillation of it yielded some interesting information. This oil showed a specific gravity of 0.925, and was dextrogyre (+ 5°). The specific gravity of the commercial varieties referred to varies between 0.915 and 0.925, and though they are always dextrogyre, their rotatory power varies between 1.3° and 15.4°. Six commercial samples examined varied from 50 to 70 per cent. in the amount of Eucalyptol they contained, and as Eucalyptol is optically inactive, this property might be utilised in judging the quality of an oil. In distilling the leaves of *E. globulus*, aldehydes of the fatty acids were observed; the presence of valeraldehyd was determined with certainty, and apparently butryaldehyd, and probably capronaldehyd were also present. The greater part of these bodies was dissolved in the distillation water, but the valeraldehyd could also be detected in the oil; it was also present in two commercial samples of the oil." (Report of Messrs. Schimmel & Co., Dresden, in *Pharm. Journ.*, April, 1888.)

Tasmania, Southern and Eastern Victoria, and Southern New South Wales.

12. **Eucalyptus goniocalyx**, *F.v.M.*, (Syn. *E. elæophora*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 229.

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* This species has been extensively cultivated in Southern France and Algeria, California, etc.

"Called "Mountain Ash," "Spotted Gum," etc. (For other vernacular names, with the localities in which they are used, see "Timbers.")

The essential oil of this Eucalypt is pale yellow; of pungent, penetrating, rather disagreeable odour, and exceedingly unpleasant taste. Sp. gr., 0.918; boiling point, 152° to 175°. (Wittstein and Mueller.) 100lbs. of fresh leaves gave 16ozs. of essential oil. (Bosisto.)

Victoria and New South Wales, as far north as Braidwood.

13. **Eucalyptus gracilis,** *F.v.M.*, (Syn. *E. fruticetorum*, F v.M., (partly); *E. calycogona*, Turcz.; *E. celastroides*, Turcz.); N.O., Myrtaceæ, B.Fl., iii., 211.

A "Mallee," or "Desert Gum."

Baron Mueller found that 1000lbs. of fresh twigs of this plant (comprising perhaps 500lbs. of leaves) yielded 54½ozs. of essential oil.

Forms, with other species of Eucalyptus, the "Mallee" country of Victoria, New South Wales, Queensland and South-western Australia.

14. **Eucalyptus hæmastoma,** *Smith*, (Syn. *E. signata*, F.v.M.; *E. falcifolia*, Miq.; and including *E. micrantha*, DC.); N.O., Myrtaceæ, B.Fl., iii., 212.

"White Gum," &c. (For other vernacular names of this tree, see "Timbers.")

The essential oil from the fresh leaves gives a yield of 1.875 per cent; in other words, 672ozs. of oil from one ton of leaves; it has a slightly acid reaction, and a specific gravity of .880. (Staiger.) Dr. Bancroft observes that this oil is among the more agreeable oils derived from the genus, and describes the odour as being intermediate between oil of geranium and oil of peppermint. It has been suggested as a soap-perfume.

Messrs. Schimmel & Co. have recently published the following report on a Queensland sample of this oil: "Specific gravity 0.890; boils from 170° to 250°. This oil differs from all other described Eucalyptus oils, and has an odour resembling that of cumin oil. It contains terpene and cymol, and among the

oxygenated compounds is one having a peppermint odour, probably menthon."

Illawarra (New South Wales) to Wide Bay (Queensland).

15. **Eucalyptus incrassata,** *Labill.*, (Syn. *E. dumosa*, (B.Fl., iii., 230,) A. Cunn.; *E. angulosa*, Schau.; *E. cuspidata*, Turcz.; *E. costata*, Behr., et F.v.M.; *E. santalifolia*, Miq.; *E. lamprocarpa*, F.v.M.; *E. Muelleri*, Miq.; *E. fruticetorum*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 231.

A "Mallee."

Baron Mueller found that 1000lbs. of fresh twigs of this tree (comprising, perhaps, 500lbs. of leaves) yielded 140ozs. of essential oil.

The whole southern part of the continent.

16. **Eucalyptus leucoxylon,** *F.v.M.*, (Syn. *E. sideroxylon*, A. Cunn.); N.O., Myrtaceæ, B.Fl., iii., 209.

"Ironbark." (For the numerous other vernacular names of this tree, see "Timbers.")

Bosisto (*Trans. R.S., Victoria*, vol. vi., 1861-4) gives the yield of essential oil at 16ozs. 7drs. from 100lbs. of the leaves, but says this amount must be taken as approximate only, as the leaves had lost some part of their oil through being heated in transit. This is, of course, a fraction over 1 per cent. The oil is thin, limpid, very pale yellow; the taste and smell are like that of the oil of *E. oleosa*; sp. gr., 0.923; boiling point, 155° to 178°. (Wittstein and Mueller.)

Spencer's Gulf (South Australia), through Victoria and New South Wales to Southern Queensland.

17. **Eucalyptus longifolia,** *Link*, (Syn. *E. Woolsii*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 226.

"Woolly Butt," or "Bastard Box."

This essential oil has an aromatic and cooling taste, and fragrant, camphor-like smell; sp. gr. 0.940; boiling point, 194° to 215°. (Wittstein and Mueller.) The yield of essential oil from 100lbs. of leaves, which had suffered in transit, was 3oz. 3½drs.

This oil much resembles an expressed oil, and possesses the remarkable property of imparting an indelible stain to paper, indicating that some peculiar substance is held by it in solution. Its high specific gravity bears out this supposition. (Bosisto.)

Victoria, and New South Wales, as far north as Port Jackson.

18. **Eucalyptus maculata,** *Hook.f.*, (Syn. *E. variegata*, F.v.M.; *E. peltata*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 254 and 258.

"Spotted Gum."

The fresh leaves yield, on distillation, a neutral oil of specific gravity 0.891. (Staiger.)

Port Jackson, northward, to Central Queensland.

19. **Eucalyptus maculata,** *Hook.f.*, var. **citriodora,** N.O., Myrtaceæ, B.Fl., iii., 257.

"Lemon, or Citron-scented Gum." (For synonyms, see "Timbers.")

The dry leaves yield a neutral essential oil of specific gravity .892. (Staiger.) It possesses the remarkably delicious odour of the leaves. (See *E. Baileyana.*)

Queensland.

20. **Eucalyptus microcorys,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 212.

"Tallow-wood," or "Turpentine." (For other vernacular names, see "Timbers.")

The fresh leaves of this tree yield 1.960 per cent. (other figures give 375ozs. to one ton of leaves) of an essential oil of an acid reaction, and a specific gravity of .896. (Staiger.) This oil has not a very agreeable odour (see remarks under *E. Baileyana*), but it probably might be found useful in varnish-making.

Dr. Bancroft points out that the oil distilled from the young leaves is of finer quality and more fragrant than that from the mature foliage, which remark is probably true of most Eucalypts. (See *E. Baileyana.*)

Northern coast districts of New South Wales to Cleveland Bay (Queensland).

21. **Eucalyptus obliqua,** *L'Herit.*, N.O., Myrtaceæ, B.Fl., iii., 204.

Variously called "Stringybark," "Messmate," "Black Box," and "Ironbark Box." (For synonyms, see "Timbers.")

The essential oil is reddish-yellow, of mild odour, and bitter taste. Sp. gr., 0.899; boiling point, 171° to 195°; it becomes turbid at 18°. (Wittstein and Mueller.)

Southern coast districts of New South Wales, but chiefly in Tasmania, Victoria and South Australia.

22. **Eucalyptus odorata,** *Behr.*, (Syn. *E. porosa*, Miq.; *E. cajuputea*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 215.

Variously called "Peppermint Box" and "Red Gum."

Baron Mueller found that 1000lbs of twigs of this tree (comprising, perhaps, 500lbs. of leaves) yielded 112½ozs. of essential oil. Bosisto (*Trans. R.S., Victoria*, vol. vi., 1861-4), however, gives the following figures :—100lbs. of leaves from trees growing on elevated spots yielded 4oz. 13drs. of oil, of specific gravity 922, while the same quantity of leaves from trees growing on low, swampy lands, yielded only 5½drs. of oil of specific gravity .899. It is pale-yellowish, with a greenish tinge, and an aromatic, somewhat camphoraceous smell. It boils between 157° and 199°.

South Australia, Victoria, and New South Wales.

23. **Eucalyptus oleosa,** *F.v.M.*, (Syn. *E. socialis*, F.v.M.; *E. turbinata*, F.v.M., et Behr.); N.O., Myrtaceæ, B.Fl., iii., 248.

A "Mallee."

Baron Mueller found that 1000lbs. of the foliage of this tree (of which perhaps half the weight consisted of branchlets) yielded 62½oz. of oil (Mr. Bosisto's figures are 20oz. of oil from 100lbs. of the green leaves and branchlets), of ·911 specific gravity, at 70° F., boiling at 341° F., and of rather a pleasant mint-like and camphoraceous odour, and yellowish colour. (Later experiments give the specific gravity at ·904.)

Oil of *Eucalyptus oleosa.*

Specific Gravity at 15.5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
.9322	13.5°	1.4661	1.4718	1.4909	+4°

These determinations were made by Dr. Gladstone. The rotatory power was determined for a column of liquid 10 inches long. (*Watts' Dict. of Chem.*)

Western and South Australia, Victoria and New South Wales.

24. **Eucalyptus Planchoniana,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm., xi.

The fresh leaves yield .06 per cent. of an essential oil, having a specific gravity of .915. (Staiger.)

The odour of this oil is described as peculiar, allied to citronelle, but differing from it. It has been suggested as a soap-perfume.

Near Brisbane, and Northern New South Wales.

25. **Eucalyptus populifolia,** *Hook.*, (Syn. *E. populnea*, F.v.M.; and including *E. largiflorens* var. *parviflora*, Benth.; *E. platyphylla*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 214.

Variously called "Poplar Box," "Red Box," "White Box," "Bimbil, or Bembil Box."

The essential oil obtained from the leaves closely resembles cajeput in odour, perhaps more so than any other Eucalyptus oil.

New South Wales, Queensland and Northern Australia.

26. **Eucalyptus rostrata,** *Schlecht.*, N.O., Myrtaceæ, B.Fl., iii., 240.

"Red Gum." (For the numerous other vernacular names and botanical synonyms of this Eucalypt, see "Timbers.")

The essential oil is pale-yellow to reddish-amber in colour; it smells and tastes like that from *E. odorata*; is of 0.918 specific gravity, and boils at 137° to 181° F. (Wittstein and Mueller.)

Plants grown on high ground give an oil of a dark amber colour, possessing an agreeable aromatic flavour, and having the odour of caraways. The yield from 100lbs. of the fresh gathered leaves was 1 oz. 6drs. The plants grown on low marshy soil yielded an oil of a pale-yellow colour, in appearance and smell similar to that yielded by *E. odorata*, the quantity being 9½drs. to 100lbs. (Bosisto, *Trans. R.S., Victoria*, vol. vi., 1861-4.)

South Australia to Northern Queensland.

27. **Eucalyptus Staigeriana**, *F.v.M.*, N.O., Myrtaceæ, Bailey in Synop. Queensland Flora.

"Lemon-scented Ironbark."

The leaves possess an odour very like the scented verbena *(Lippia citriodora)*, and yield an oil similar to the verbena oil (from *Andropogon citratus*) of commerce. Mr. Staiger found the dried leaves to yield 2¾ to 3 per cent. (other figures give 1290oz. to 1 ton of dry leaves) of volatile oil of specific gravity .901. Later experiments fix the specific gravity at .871, while Messrs. Schimmel & Co., of Dresden, give the specific gravity 0.880, and boiling point from 170° to 230°.

It is said that the yield of oil from this Eucalypt is only exceeded by one other species, viz., *E. amygdalina*, and the yield is only very slightly in favour of the latter. Compare *Backhousia citriodora*.

Queensland.

28. **Eucalyptus uncinata**, *Turcz.*, (Syn. *E. leptophylla*, Miq.; *E. oleosa*, F.v.M. (partly); N.O., Myrtaceæ, B.Fl., iii., 216.

A "Mallee." "Gunamalary" of the aboriginals of the Lake Hindmarsh Station (Victoria).

Baron Mueller found that 1000lbs. of twigs of this tree (comprising, perhaps, 500lbs. of foliage) yielded 69ozs. of essential oil.

West and South Australia, Victoria and New South Wales.

29. **Eucalyptus viminalis**, *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 239.

"Manna Gum." "Grey Gum." "White Gum." (For the other numerous vernacular names and botanical synonyms of this Eucalypt, see "Timbers.")

The essential oil is of a pale yellowish-green colour, of disagreeable, but not penetrating smell; of 0.921 sp. gr.; it boils at 159° to 182°. (Wittstein and Mueller.) A tree grown at St. Kilda, Melbourne, yielded Mr. Bosisto half-an-ounce of oil per 100lbs. of leaves. The sp. gr. of the essential oil of *E. dealbata* (*viminalis*) is given by Mr. Staiger at .871 at 72° F. Its odour is described as being allied to citronelle, though differing from it, and it is suggested as a soap-perfume. Messrs. Schimmel & Co. (*Pharm. Journ.*, April, 1888) speak of the oil of *E. dealbata* as possessing, in common with those of *E. Baileyana, E. microcorys*, and *E. maculata*, var. *citriodora*, "a magnificent, melissa-like odour, which, especially in the oil of *E. dealbata*, is manifest in a surprisingly fine and rich bouquet. It is thought they will prove to possess extraordinary practical value."

Bosisto (*Trans. R.S., Victoria*, vol. vi., 1861-4) states that the oil of *E. fabrorum* (*viminalis*) is transparent, reddish-yellow, milder in odour than that from *E. globulus;* in flavour, resembling caraways and smoke-essence combined, and distinctly bitter to the taste. Yield: 8ozs., from 100lbs. of fresh leaves.

Tasmania, South Australia, through Victoria to New South Wales.

30. **Melaleuca decussata,** *R.Br.*, (Syn. *M. parviflora*, Reichb.; *M. oligantha*, F.v.M.; *M. tetragona*, Otto.); N.O., Myrtaceæ, B.Fl., iii., 133.

The essential oil is of oily consistence and amber colour, sp. gr. 0·938; it boils at 185°-209°, and resembles the oil from *M. Wilsonii.* (*Wittstein.*) 100lbs. of the leaves and branchlets yielded about 6oz. of essential oil. (Mueller.)

Victoria and South Australia.

31. **Melaleuca ericifolia,** *Smith*, (Syn. *M. nodosa*, Sieb. non Smith; *M. Gunniana*, Schau; *M. heliophila*, F.v.M.); N.O. Myrtaceæ, B.Fl., iii., 159.

The essential oil is pale yellow, and has a taste and smell like cajeput oil; is thin, specific gravity 0·899—0·902, and boils at 149°—184°. (Wittstein and Mueller.) 100lbs. of the leaves and smaller branches yield 5 oz. of oil. With age, it improves greatly. (Bosisto.)

Oil of *Melaleuca ericifolia.*

Specific Gravity at 15.5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
.9030	9°	1.4655	1.4712	1.4901	+26°

These determinations were made by Dr. Gladstone.

The rotatory power was determined for a colour of liquid 10 inches long.

All the colonies except Western Australia.

32. **Melaleuca genistifolia,** *Smith,* (Syn. *M. lanceolata,* Otto; *M. bracteata,* F.v.M.; *Metrosideros decora,* Salisb.); N.O., Myrtaceæ.

"Ridge Myrtle." Called "Ironwood" in Queensland.

The essential oil is pale greenish-yellow, and mild in odour and taste. Mr. Bosisto gives 1oz. 2drs. as the approximate yield of oil from 100lbs. of leaves and branchlets.

New South Wales to Northern Australia.

33. **Melaleuca Leucadendron,** *Linn.,* (Syn. *M. Cajuputi,* Roxb.; *M. minor,* Smith; *M. viridiflora,* Gærtn.; *M. saligna,* Blume; *Metrosideros albida,* Sieb.; *M. coriacea,* Salisb.); N.O., Myrtaceæ, B.Fl., iii., 142. *M. Leucadendra* in Muell. Cens., p. 55.

"White Tea-tree." "Broad-leaved Tea-tree." "Swamp Tea-tree." "Paper-barked Tea-tree." "Atchoourgo" of the aboriginals of the Mitchell River, North Queensland. "Whitewood" of Northern Territory.

This is a tree which has several fairly well-defined varieties. The fresh leaves of the Australian variety yield ·895 per cent. of a

slightly acid essential oil, of specific gravity ·917. (Staiger.) Dr. Bancroft, (speaking of *M. Leucadendron* var. *lancifolia*), considers "this oil to be more agreeable than that of cajeput oil, which it closely resembles." He finds that small insects imprisoned in its vapour are intoxicated. He has found it of value as an antiseptic inhalation in phthisis, for which purpose he considers it more pleasant than Eucalyptus oil. A sample of Queensland oil, however, examined at the Colonial and Indian Exhibition by an expert, was described as having "a distinctly disagreeable odour, not resembling cajeput, but reminding one of rotten fruit," so that probably the variety yielding it is somewhat removed from the typical form yielding the cajeput oil of commerce. In Bentley and Trimen's *Medicinal Plants*, 108, the name *Melaleuca minor* is retained as the species name for the cajeput oil plant; "as, however, it appears that this is the form only from which the oil is obtained, we have maintained the specific name without intending thereby to express any opinion as to its distinctness from the common Australian 'Tea-tree' (*M. Leucadendron.*)"

I have, however, given a few notes on cajeput oil, although I am a little uncertain as to whether the particular variety of *Melaleuca* which produces it is actually indigenous in Australia. But, whether it is actually indigenous or not, the oils yielded by the various species of *Melaleuca* possess a greater or less family likeness, and as the oil of the present species has been most worked at, the notes will be useful as a guide.

Rumphius says that the leaves are gathered on a warm day and placed in a sack, where they become hot and damp. They are then macerated in water and left to ferment for a night, and afterwards submitted to distillation. Two sacksful of the leaves yield only about three fluid drachms of the oil. Lesson's account is also given in Bentley and Trimen's *Medicinal Plants*. This is probably a proper and convenient way of treating the leaves of many of our myrtaceous trees with the view of extracting the oil they contain.

"Cajuput, or cajeput oil, is much used in India as an external application for rheumatism. It is a powerful anti-spasmodic diffusible stimulant, and sudorific. It is coming more into use in

European practice. It varies in colour from yellowish-green to bluish-green; it is a transparent mobile fluid, with an agreeable camphoraceous odour, and bitter aromatic taste, sp. gr. 0·926, it remains liquid at 13°C., and deviates the ray of polarized light to the left. (The author has noticed the oil of every shade of brown, but when exposed to the light it in a few days turns to a greenish colour.) The green tint of the oil may be due to copper*, a minute proportion of which metal is usually present in all that is imported. It may be made evident by agitating the oil with very dilute hydrochloric acid. To the acid, after it has been put into a platinum capsule, a little zinc should be added, when the copper will be immediately deposited on the platinum. The liquid may then be poured off, and the copper dissolved and tested. When the oil is rectified, it is obtained colourless, but it readily becomes green if in contact for a short time with metallic copper. Guibourt has, however, proved by experiment, that the volatile oil obtained by the distillation of the leaves of several species of *Melaleuca*, *Metrosideros* and *Eucalyptus*, has naturally a fine green hue. It is not improbable that this hue is transient, and that the contamination with copper is intentional, in order to obtain a permanent green." (*Materia Medica of Western India*, Dymock.)

Oil of cajeput consists mainly of the dihydrate of a hydrocarbon, called *Cajputene*, isomeric with oil of turpentine. On submitting it to fractional distillation, dihydrate of cajputene, which constitutes about two-thirds of the crude oil, passes over between 175° and 178°; smaller fractions, perhaps products of decomposition, are obtained from 178° to 240°, and from 240° to 250°; and at 250° only a small residue is left, consisting of carbonaceous matter mixed with metallic copper. On treating this residue with ether, a green solution is obtained, which, when evaporated, leaves a green resin, soluble in the portion which boils between 175° and 178°, and capable of restoring the original colour. (*Watts' Dict.*, i., 710.) For a full account of *Cajputene*, *Isocajputene*, *Paracajputene*, and the salts of Cajputene, see p. 711-2, *loc. cit.*

* This is by no means proved. The question is discussed in almost every treatise on *Materia Medica*.

Cajeput Oil.

Specific Gravity at 15.5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
.9203	25.5°	1.4561	1.4611	1.4778	0°

These determinations were made by Dr. Gladstone. The rotatory power was determined for a column of liquid 10 inches long.

Western Australia, New South Wales and Northern Australia.

34. **Melaleuca linariifolia,** *Smith,* (Syn. *Metrosideros hyssopifolia,* Cav.); N.O., Myrtaceæ, B.Fl., iii., 140.

The essential oil is light-straw coloured, mobile, of rather pleasant cajeput-like odour; very agreeable taste, suggestive of mace, but afterwards mint-like; of 0.903 specific gravity, and boiling point 175° to 187°. (*Jurors' Report Exhib.*, 1862, chiefly from Bosisto's experiments.) Mr. Bosisto obtained 28 ozs. from 100lbs. of the fresh leaves.

Oil of *Melaleuca linariifolia.*

Specific Gravity at 15.5° C.	Refractive Index.				Rotation.
	Temp.	A	D	H	
.9016	9°	1.4710	1.4772	1.4971	+11°

These determinations were made by Dr. Gladstone.

The rotatory power was determined for a column of liquid 10 inches long.

New South Wales and Queensland.

35. **Melaleuca squarrosa,** *Smith,* (Syn. *M. myrtifolia,* Vent.); N.O., Myrtaceæ, B.Fl., iii., 140.

The essential oil from this shrub is green, and of disagreeable taste. Yield, only 5drs. from 100lbs. of material. (Bosisto.)

South Australia, Tasmania, Victoria and New South Wales.

36. **Melaleuca uncinata,** *R.Br.*, (Syn. *M. hamata*, F. and G. Sert., Pl.; *M. Drummondii*, Schau.; *M. semiteres*, Schau.); N.O., Myrtaceæ, B.Fl. iii., 150.

Common "Tea-tree." Called "Broom" in South Australia. "Yaangarra" of the aboriginals of Illawarra (New South Wales); "Dyurr" of those of Lake Hindmarsh Station (Victoria).

This essential oil is green, and smells like that of *M. ericifolia*, with an admixture of peppermint. (Wittstein.)

South and Western Australia, Victoria and New South Wales, and Queensland.

37. **Melaleuca Wilsonii,** *F.v.M.*; N.O., Myrtaceæ, B.Fl. iii., 134.

This essential oil somewhat resembles cajeput oil, and is of 0.925 specific gravity. The yield is 4 ozs. from 100lbs. of green material; the oil is of a pale-yellow colour; in odour, slightly resembling that from *M. ericifolia*, but devoid of its sweetness. (Bosisto.)

Victoria and South Australia.

8. **Mentha australis,** *R.Br.*, (Syn. *Micromeria australis*, Benth.); N.O., Labiatæ, B.Fl. v. 83.

"Native Peppermint." "Panaryle" of the natives at the Coranderrk (Victoria). (Query: Is this an aboriginal attempt to pronounce the ...nyroyal?")

...e and smell, this oil hardly differs from ordinary oil of

Statio... but it may be described as somewhat coarser than the

word "F... In t... f that substance. (*Report of Dublin Exh.*, 1865.)

peppermi...ined 3 ozs. of oil from 100lbs. of this plant.

best sampl...ies except Western Australia.

Mr. Bosisto ...s, *R.Br.*, (Syn. *Micromeria gracilis*, Benth.);

All the ... B.Fl., v., 83.

39. **Mentha** ...which this oil is obtained contains a portion of

N.O., L... stems, the total yield from 100lbs. of the

The h...ozs. Its smell is like oil of peppermint, with a

... volatile

slight admixture of pennyroyal. The supply of oil from the leaves is tolerably copious, 100lbs. of the fresh green shrub, inclusive of branchlets, furnishing 6½ozs. of a pale-yellow, limpid oil, the odour of which is hardly distinguishable from that of oil of rue, though, perhaps, a little intense and penetrating. Its taste is very disagreeable and acrid, strongly resembling that of rue. The medicinal action of this oil is that of a diuretic and diaphoretic. (*Report Dublin Exh.*, 1865.)

All the colonies except Western Australia and Queensland.

40. **Mentha grandiflora,** *Benth.*, N.O., Myrtaceæ, B.Fl., v. 82.

This mint oil has a fiery, bitter, and very unpleasant nauseous taste, together with a characteristic after-taste. It could not be used as a substitute for common peppermint, except for medical purposes. Its specific gravity is .924, and its yield 5 oz. from 100lbs. of the fresh herb. (*Report of Dublin Exhibition*, 1865.)

New South Wales and Queensland.

41. **Mentha laxiflora,** *Benth.*, N.O., Labiatæ, B.Fl., v. 82.

This plant yields, on distillation, a pleasant oil, similar to that from peppermint.

Victoria and New South Wales.

42. **Nesodaphne obtusifolia,** *Benth.*, (Syn. *Beilschmiedia obtusifolia*, Benth., et Hook.; *Cryptocarya obtusifolia*, F.v.M.); N.O., Laurineæ, B.Fl., v. 299. *B. obtusifolia* in Muell. Cens., p. 3.

"Queensland Sassafras."

One ton of the dry bark yields 770 oz. of essential oil (Staiger), =2.15 per cent. The specific gravity is .978 at 72°F.

New South Wales and Queensland.

43. **Pittosporum undulatum,** *Vent.*, N.O. Pittosporeæ, B.Fl., i., 111.

"Native Laurel." "Mock Orange." "Wallundun-deyren" of the aborigines.

The oil obtained from the flowers by distillation is limpid, colourless, lighter than water, of an exceedingly agreeable jasmine-like odour; the taste disagreeably hot and bitter, reminding one

slightly of turpentine and rue. (Bailey.) 100lbs. of flowers gave, on distillation, 2 oz. of essential oil (Mueller). Iodine, when brought in contact with it, gives rise to an explosion. This is true of many other oils.

Tasmania, Victoria, New South Wales and Queensland.

44. **Polypodium phymatodes,** *Linn.*, (Syn. *Pleopeltis phymatodes,* T. Moore); N.O., Filices, B.Fl., vii., 769.

This plant yields an aromatic oil, said to be used in the South Sea Islands for perfuming cocoa-nut oil (Woolls.) See *Angiopteris evecta.*

Queensland and Northern Australia.

45. **Prostanthera lasianthos,** *Labill.*, N.O., Labiatæ, B.Fl., v., 93.

Called "Dogwood" in Victoria. "Coranderrk;" the aboriginal station of that name is called after this plant.

A greenish-yellow oil, limpid, and of mint-like odour and taste, and specific gravity 0.912. The yield from 100lbs. of fresh leaves is 2 oz. $4\frac{1}{8}$ drachms. (Bosisto.)

All the colonies.

46. **Prostanthera rotundifolia,** *R.Br.*, (Syn. *P. retusa,* R.Br.; *P. cotinifolia,* A. Cunn.); N.O., Labiatæ, B.Fl., v., 96.

This essential oil is of darker colour, and of sp. gr. 0.941, but otherwise resembling the oil from *P. lasianthos.* (*Report of Exh.*, 1862.) The yield from 100lbs. of leaves is 12 ozs. of oil. These oils are carminative. (Bosisto.)

All the colonies except Queensland and Western Australia.

47. **Zieria Smithii,** *Andr.*, (Syn. *Z. lanceolata,* R.Br.; *Boronia arborescens,* F.v.M.); N.O., Rutaceæ, B.Fl., i., 306.

Colonial names are "Sandfly Bush" and "Turmeric." It is called "Stinkwood" in Tasmania.

The essential oil is distilled from the leaves. It is pale yellow, of the taste and odour of rue, and of 0.950 specific gravity. (*Report Exhib.*, 1862.) 100lbs. of the green material produce $6\frac{1}{2}$ozs. of oil. (Bosisto.)

All the colonies except South and Western Australia.

OILS:

B. (EXPRESSED OR FIXED.)

AUSTRALIA is as remarkable for its fewness of plants yielding fixed oils in any quantity, as it is for its wealth of plants yielding essential oils. As far as the author is aware, not a single indigenous species actually yields, in this continent, fruits or seeds for the oil-press.

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1. **Aleurites moluccana,** *Willd.*, (Syn. *A. Ambinux*, Pers.; *A. triloba*, Forst.; *Jatropha moluccana*, Linn.); N.O., Euphorbiaceæ, B.Fl. vi., 128; *A. triloba* in Muell., Cens., p. 20.

"Candle-nut."

This tree also flourishes in the East-Indies and South Pacific Islands. The nuts look like small walnuts, only they are more spherical, and the kernels are so full of oil that in some of the South Sea Islands they are threaded on a reed and serve as a torch. They yield an excellent drying oil, useful to artists, and called "Country Walnut Oil" in India, "Kekune Oil" in Ceylon, and "Kekui Oil" at Honolulu. *(Treasury of Botany.)* The kernels are said to yield 54.3 per cent. of oil, and 45.7 per cent. of amylaceous and nitrogenous substances. This latter gives 10¼ per cent. of ash, rich in phosphoric acid. (Staiger.)

The results of a set of experiments by the Italian chemist, Nallino, are given in *Watts' Dict.*, vii., 2nd Suppt. 239.

Average weight of husks	6.5 grams.
" " almonds ...	3.3 "

Composition of husks:—

Water	3.71
Organic matter	89.9
Mineral do.	6.39

Composition of almonds:—

Water	5.25
Fat (extracted by carbon bisulphide) ...	62.97
Cellulose, and other organic matters ...	28.99
Mineral matter	2.79

Composition of the ash of the almond:—

Lime	18.69
Magnesia...	6.01
Potash	11.33
Phosphoric acid	29.3

The fatty matter extracted from the almonds by carbon bisulphide at ordinary temperatures forms a transparent, amber-yellow syrupy liquid. When cooled to 10° it becomes viscous, but neither loses its transparency nor changes colour.

Queensland.

2. **Calophyllum inophyllum,** *Linn.*, N.O., Guttiferæ, B.Fl., i., 183.

The "Ndilo" of India.

This tree is widely distributed throughout India, where a greenish coloured oil is extracted from the seeds, and is used for burning by the poorer classes. It is also used as an application in rheumatism, &c. (Dymock, *Materia Medica of Western India.*)

The following analysis of Queensland grown fruits is by Mr. K. T. Staiger:—

Shells	62.5
Kernels	37.5
	100.
Greenish-yellow oil	43
Dry residue	27
Moisture	30
	100.

Ashes of whole kernels, 1.66 per cent. Ashes of exhausted residue, 6.15 per cent. The green oil, on saponification, yields a

bright-yellow soap, the green pigment of the oil having been changed into a bright yellow.

The oil is bitter and aromatic; specific gravity .942; it solidifies at +5°. (Lepine.)

Queensland.

3. **Cerbera Odollam,** *Gaertn.*, (Syn. *C. Manghas*, Bot. Mag.); N.O., Apocyneæ, B.Fl., iv., 306.

The seeds give an oil which is used for burning in India.

Queensland and Northern Australia.

4. **Cocos nucifera,** *Linn.;* N.O., Palmeæ, B.Fl., vii., 143.

"Cocoa-nut Palm."

Oil is procured by boiling and pressing the white kernel of the nut (albumen). It is liquid at the ordinary temperature in tropical countries, and while fresh is used in cookery; but in England, and even in many parts of Australia it is semi-solid, and has generally a somewhat rancid smell and taste. By pressure, it is separated into two parts; one, stearine, is solid, and is used in the manufacture of stearine candles, the other being liquid, is burned in lamps. It is a pale-yellow oil, which, in cold weather, concretes into a white butter. One part of it boiled with caustic soda solution forms from two to three parts of a hard, white soap, perfectly soluble in alcohol. The oil, and the soap in a less degree, has a faint characteristic odour. Solidified cocoa-nut oil melts at 20° C; melted, it solidifies at 18° C. When kept for some minutes at a temperature of 240° C, it remains fluid for forty-eight hours.

Queensland.

5. **Fusanus acuminatus,** *R.Br.*, (Syn. *Santalum acuminatum*, A. DC.; *S. Pressianum*, Miq.; *S. cognatum*, Miq.); N.O., Santalaceæ, B.Fl., vi., 215. Described in Muell. Cens., p. 64, as *Santalum acuminatum*.

"Quandong," or "Native Peach."

The kernels of the nuts (Quandongs) of this small tree are not only palatable and nutritious, but they are so full of oil that if speared on a stick or reed they will burn entirely away with a clear

light, much in the same way as candle-nuts (*Aleurites triloba*) do. Quandongs are so abundant in parts of the country that they may possibly be used as oil-seeds in the future.

Queensland and New South Wales to Western Australia.

6. **Hernandia bivalvis**, *Benth.*, N.O., Laurineæ, B.Fl., v. 314.

"Grease-nut" Tree. "Cudgerie" of the aboriginals.

The kernel contains 64.8 per cent. of oil, which is similar to common laurel oil, is of the same consistency, and has also the same stearine and narcotic smell. (Staiger.)

Queensland.

7. **Pongamia glabra**, *Vent.*, N.O., Leguminosæ, B.Fl., ii., 273.

"Indian Beech."

The seeds yield an oil, pale-sherry coloured (Dymock), thick, red-brown (Gamble), used for burning, and in skin diseases by the people of India. It solidifies below 60°F. The yield of oil from the seeds is 27 per cent., having a specific gravity of .945, and solidifying at 8°C. (Dymock.)

Queensland and Northern Australia.

8. **Ricinocarpus pinifolius**, *Desf.*, (Syn. *R. sidaeformis*, F.v.M.; *Rœperia pinifolia*, Spreng.; *Echinosphœra rosmarinoides*, Sieb.); N.O., Euphorbiaceæ, B.Fl., vi., 70.

"Native Jasmine."

This plant yields abundance of seeds, like small castor-oil seeds. They yield an oil which does not appear to have yet been examined.

Tasmania, Victoria, New South Wales and Queensland.

9. **Semecarpus Anacardium**, *Linn.*, (Syn. *S. australasicus*, Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut Tree."

A sweet oil is obtained from the seeds, used in painting in India. (*Treasury of Botany.*) The pericarp contains 32 per cent. of a vesicating oil of sp. gr. .991, easily soluble in ether, and blackening on exposure to the air. (Dymock.)

Queensland and Northern Australia.

10. **Terminalia Catappa,** *Linn.*, N.O., Combretaceæ, Muell. Cens., p. 50.

"Country Almond" (India).

The kernels of the nuts of this tree produce over 50 per cent. of a peculiarly bland oil. (Drury.) It is edible and pleasant tasted, but if kept for any time deposits a large quantity of stearine. It has been suggested as a substitute for almond oil. This plant is not endemic in Australia.

Queensland.

PERFUMES.

(SEE ALSO "ESSENTIAL OILS.")

ALTHOUGH many Australian plants (notably a few of the wattles) have sweet-scented flowers, the author is not aware of any serious attempt having yet been made in the colonies to utilize their perfumes. Several of the essential oils, *e.g.*, *Backhousia citriodora*, *Eucalyptus maculata*, var. *citriodora* and *E. Staigeriana*, page 254 et seq., obtained from the leaves of plants are really perfumes, and their chief use is in scenting soaps, and other preparations. But the quantity obtained is but small, and the plants used are wild. The advice to landowners to try the planting of perfume plants has been frequently given, but it does not appear to promise a heavy profit immediately, and so the industry is neglected. Many parts of littoral Australia are very gardens of flowers, and for a comfortable selector to establish the minor industry of flower-farming and storage of their perfumes, there would be but little outlay; the time required would chiefly be odd moments, while the produce would be a valuable commodity. But, however much we may regret it, we must acknowledge that there is too little enterprise amongst those of us engaged in tilling the soil.

The following is interesting, being from the pen of an authority on perfumery, and one who had travelled in Australia, and who had facilities for learning about Australia not possessed by many dwellers in Europe :—

"The commercial value of flowers is of no mean importance to the wealth of nations. But, vast as is the consumption of perfumes by the people under the rule of the British Empire, little has been done in England, either at home or in her tropical colonies, towards the establishment of flower-farms, or the pro-

duction of the raw odorous substances in demand by the manufacturing perfumers of Britain ; consequently, nearly the whole are the produce of foreign countries.

"The climate of some of the British colonies especially fits them for the production of odours from flowers that require elevated temperature to bring them to perfection.

"But for the lamented death of Mr. Charles Piesse, Colonial Secretary for Western Australia, flower-farms would doubtless have been established in that colony long ere the publication of this work (1862). Though thus personally frustrated in adapting a new and useful description of labour to British enterprise, I am no less sanguine of the final results in other hands." (Piesse, *The Art of Perfumery.*)

The few species given below do not profess to be a complete list of Australian perfume plants; the list may, however, be suggestive.

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1. **Acacia conferta,** *A Cunn.*, N.O., Leguminosæ, B.Fl., ii., 343.

The flowers of this tree possess a remarkable perfume which Dr. Woolls thinks might be utilized commercially. The following species—**Acacia acuminata,** *Benth.*, **A. doratoxylon,** *A. Cunn.*, **A. harpophylla,** *F.v.M.*, **A. pendula,** *A. Cunn.*, amongst others, yield scented wood, and, therefore, may rank amongst perfumes. (See "Timbers.")

New South Wales and Queensland.

2. **Acacia farnesiana,** *Willd.*, (Syn. *A. lenticillata*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 419.

"Dead Finish" is the absurd name given to the wood.

The flowers yield a delightful perfume, and for that quality are much cultivated in the South of France. The cultivation of this plant is particularly worthy the attention of settlers in Australia as an auxiliary industry. In Italy and France its sweet-scented flowers are mixed with melted fat or olive oil, which becomes impregnated with their odour, and constitutes the fine pomade called "Cassie."

U

Interior of South Australia, New South Wales, Queensland and Northern Australia.

3. **Acacia pycnantha,** *Benth.*, (Syn. *A. petiolaris*, Lehm; *A. falcinella*, Meissn.); N.O., Leguminosæ, B.Fl., ii., 365.

"Golden Wattle." "Green Wattle." "Broad-leaved Wattle."

An extract of the flowers of this Wattle was shown as a perfume at the Colonial and Indian Exhibition of 1886.

A score of other species of *Acacia*, *e.g.*, *A. suaveolens*, might be selected as worthy of culture as perfume plants. "Mutton fat being cheap, and the Wattle plentiful, a profitable trade may be anticipated in curing the flowers, &c." (Piesse, *Art of Perfumery.*)

South Australia, Victoria and New South Wales.

4. **Andropogon schœnanthus,** *Linn.*, (Syn. *A. Martini*, Roxb.; *A. citratum*, DC.; *A. Nardus*, Linn.; *Cymbopogon schœnanthus*, Spreng.); N.O., Gramineæ, B.Fl., vii., 534.

A strong-growing grass, more in repute as a perfume than a fodder. Other species of *Andropogon* are more or less aromatic.

Queensland.

5. **Anisomeles salvifolia,** *R.Br.*, N.O., Labiatæ, B.Fl., v. 89.

Mr. P. A. O'Shanesy points out that this plant may be made to yield a very delicate perfume. It is a very variable species.

Queensland and Northern Australia.

6. **Backhousia citriodora,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 270.

"Scrub Myrtle." "Native Myrtle."

The foliage of this tree is deliciously lemon-scented, like the Scented Verbena (*Lippia citriodora*). The essential oil from the leaves has been tested for scenting soaps, and has answered the purpose well. The dried leaves, put in little bags (such as are employed for holding lavender flowers) give, for a long time, a very pleasant odour to the contents of linen-presses, &c.

Queensland.

7. **Eucalyptus maculata,** *Hook f.*, var. **citriodora,** (Syn. *E. citriodora*, Hook. f.); N.O., Myrtaceæ, B.Fl., iii., 257.

"Citron, or Lemon-scented Gum." The aboriginal name is "Urara."

The leaves emit a delightful odour of citron, especially when rubbed. They should be used to perfume and protect clothes-presses. The Rev. J. E. Tenison-Woods states they are certainly a specific against cockroaches and "silver-fish" insects, which are great domestic pests.

Queensland.

8. **Guettarda speciosa,** *Linn.*, N.O., Rubiaceæ, B.Fl., iii., 419.

The flowers of this tree are exquisitely fragrant. They come out in the evening, and have all dropped on the ground by morning. The natives in Travancore distil an odoriferous water from the corollas, which is very like rose-water. In order to procure it they spread a very thin muslin cloth over the tree in the evening, taking care that it comes well in contact with the flowers as much as possible. During the heavy dew at night the cloth becomes saturated, and imbibes the extract from the flowers. It is then wrung out in the morning. The extract is sold in the bazaars.

Queensland and Northern Australia.

9. **Hierocloa spp,** (See "Grasses," p. 70.)

These possess a powerful odour of "Coumarin."

10. **Humea elegans,** *Smith*, (Syn. *Calomeria amanthoides*, Vent.); N.O., Compositæ, B.Fl. iii., 589.

The whole plant on being bruised emits a delightful scent, so overpowering as sometimes to produce headache. Dr. George Bennett *(Gatherings of a Naturalist)* is of opinion that a very valuable perfume might be obtained from it.

Victoria and New South Wales.

11. **Murraya exotica,** *Linn.*, (Syn., *M. paniculata*, Jack); N.O., Rutaceæ, B.Fl. i., 369.

"China Box."

This bush, which is also a native of India and China, has such delightfully fragrant flowers that it might be worth while to cultivate it as a perfume plant.

Queensland.

12. **Pandanus odoratissimus,** *Linn. f.*, (Syn., *P. spiralis,* R.Br.); N.O., Pandaneæ, B.Fl., vii., 148.

"Screw Pine."

The natives of India are fond of the scent of this flower, which they place amongst their clothes. The male flowers are exceedingly fragrant, and are much appreciated by the Burmese. The Hindus use them in certain of their religious ceremonies. (*Cyclop. of India.*)

Northern Australia.

13. **Pittosporum undulatum,** *Vent.*, N.O., Pittosporeæ, B.Fl., i., 111.

"Native Laurel." "Mock Orange." "Bart-bart" of the aboriginals of the Karnathun tribe, Lake Tyers (Victoria).

This tree is well worth cultivating on a commercial scale for the sake of the sweet perfume of its flowers.

All the colonies except South and Western Australia.

14. **Pterigeron liatroides,** *Benth.*, (Syn. *Pluchea ligulata,* F.v.M.; *Streptoglossa Steetzii,* F.v.M.; *Erigeron liatroides,* Turcz.); N.O., Compositæ, B.Fl., iii., 532.

This plant yields a delicious perfume, and therefore may be deemed worthy of cultivation by the horticulturist or flower-farmer.

Western and South Australia, and New South Wales.

DYES.

AUSTRALIA certainly does not appear to be a land which can boast of its native vegetable dyes. But it is only fair to observe that practically nothing has been done in the way of experiments with our raw dye-stuffs. Almost the only technological experiments with any of them are by Baron Mueller and Mr. Rummel *(Intercolonial Exhibition of Melbourne*, 1866), and which are referred to below, while Professor Rennie has investigated the pigment contained in the tubers of a species of *Drosera*, interesting, however, only from a scientific point of view.

1. **Acacia harpophylla**, *F.v.M.;* N.O., Leguminosæ, B.Fl. ii., 389.

"Brigalow."

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree. Various tints of reddish-brown were obtained.

South Queensland.

2. **Acacia subcœrulea**, *Lindl.*, (Syn., *A. hemiteles*, Benth.; *A. apiculata*, Meissn.); N.O., Leguminosæ, B.Fl. ii., 369.

"Silvery," or "Blue-leaved Acacia."

From the bark a very good yellow dye has been produced. (Bennett.)

Western Australia.

3. **Alstonia constricta**, *F.v.M.*, N.O., Apocyneæ, B.Fl., iv., 314.

"Fever Bark."

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree from Queensland. Various shades of yellow were obtained.

New South Wales and Queensland.

4. **Baloghia lucida**, *Endl.*, (Syn. *Codiæum lucidum*, Muell. Arg.); N.O., Euphorbiaceæ, B.Fl., vi., 148.

"Scrub, or Brush Bloodwood." Called also "Roger Gough." "Nunnai" and "Dooragan" are aboriginal names.

The sap from the vulnerated trunk forms, without any admixture, a beautiful red indelible pigment. (Mueller.) (See also "Kinos.")

New South Wales and Queensland.

5. **Casuarina equisetifolia**, *Forst.*, N.O., Casuarineæ, B.Fl. vi., 197.

"Forest Oak." "Swamp Oak." "Bull Oak." "Wunna-wunnerumpa" of the Queensland aboriginals.

The bark of this tree is astringent, and was formerly used by South Sea Islanders to dye their cloth.

New South Wales to Northern Australia.

6. **Cedrela toona**, *Roxb.*, (Syn. *C. australis*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 337. *C. australis* in Muell. Cens., p. 9.

Ordinary "Cedar," or "Red Cedar." (For aboriginal names, see "Timbers.")

The small flowers of this tree (called "Toon") are used for the production of a red or yellow dye in India.

New South Wales and Queensland.

7. **Chionanthus picrophloia**, *Roxb.*, (Syn. *C. effusiflora*, F.v.M.; *Linociera ramiflora*, DC.; *L. effusiflora*, F.v.M.); N.O., Jasmineæ, B.Fl., iv., 301.

"Eurpa" of the aboriginals.

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree. Various tints of brownish-yellow were obtained. This plant is not endemic in Australia.

Queensland.

8. **Cœlospermum reticulatum**, *Benth.*, (Syn. *Pogonolobus reticulatus*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 425.

The bark, which is often very thick, produces an excellent dye. (Bailey.)

Queensland and Northern Australia.

9. **Croton insularis**, *Baill.*, (Syn. *C. phebalioides*, A. Cunn.); N.O., Euphorbiaceæ, B.Fl., vi., 124.

"Queensland Cascarilla."

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree from Queensland. Reddish-browns were obtained.

New South Wales and Queensland.

10. **Cudrania javanensis**, *Trécul.*, (Syn. *Maclura javanica*, Miq.; *Morus calcar-galli*, A. Cunn.); N.O., Urticeæ, B.Fl., vi., 179.

"Cockspur Vine." "Cockspur Thorn." "Fustic."

The duramen, or heartwood, is of a dark yellow colour, is hard, and is used in dyeing yellow and brown, hence its colonial name of "Fustic." This plant is not endemic in Australia.

New South Wales and Queensland.

11. **Cynometra ramiflora**, *Linn.*, (Syn. *C. bijuga*, Span.); N.O., Leguminosæ, B.Fl. ii., 296.

Chips of this wood give in water a purple dye. (Skinner.) This plant is not endemic in Australia.

Queensland.

12. **Drosera Whittakeri**, *Planch.*, (Syn. *D. rosulata*, Behr.); N.O., Droseraceæ, B.Fl., ii., 462.

"A Sun-dew."

Dr. Rennie has extracted two beautiful red colouring matters from the bulbs of this plant. (*Vide Journ. Chem. Soc.*, April, 1887.)

Victoria and South Australia.

13. **Erythroxylon australe**, *F.v.M.*; N.O., Lineæ, B.Fl. i., 284.

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree. Tints from yellow to brown were obtained.

Queensland.

14. **Eucalyptus amygdalina**, *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 202.

"Messmate." "Stringybark." (For vernacular names and synonyms, see "Timbers.")

Some of the settlers make ink from this abundantly-produced kino. The operation merely consists in boiling the kino in an iron saucepan containing a little water. The kinos of such other Eucalypts as may happen to be convenient may be used.

Tasmania, Victoria and New South Wales.

15. **Eucalyptus corymbosa,** *Smith*, (Syn. *Metrosideros gummifera*, Soland.); N.O., Myrtaceæ, B.Fl., iii., 256.

"Bloodwood." (For other vernacular names, see *E. corymbosa*—"Timbers.")

This dark-coloured kino contains a rich dye material of a reddish colour.

New South Wales and Southern Queensland.

16. **Flindersia Oxleyana,** *F.v.M.*, (Syn. *Oxleya xanthoxyla*, Hook.); N.O., Meliaceæ, B.Fl., i., 389.

"Light Yellow-wood" of the colonists. Called "Long Jack" in Northern New South Wales, and "Yeh" by the aboriginals of the same district.

The wood of this tree yields a yellow dye.

Northern New South Wales and Queensland.

17. **Guettardella putaminosa,** *Benth.*, (Syn., *Bobea putaminosa*, F.v.M; *Timonius putaminosus*, F.v.M.); N.O., Rubiaceæ B.Fl., iii., 419.

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree. Brownish-yellows were obtained.

Queensland.

18. **Hernandia bivalvis,** *Benth.*, N.O., Laurineæ, B.Fl., iii., 425.

"Grease-nut Tree."

The shells of the fruit of this tree contain a substance which produces an excellent dye ... soluble in soda, but not in ether, alcohol, or water. (St...

Queensland.

19. **Hymenanthera dentata,** *R.Br.*, (Syn., *H. Banksii*, F.v.M.); N.O., Violaceæ, B.Fl., i., 104; *H. Banksii* in Muell., Cens., p. 6.

Dr. Ludwig Beckler drew attention to the lasting purple pigment obtainable from the berries of this plant.

Tasmania, South Australia, Victoria and New South Wales.

20. **Indigofera tinctoria,** *Linn.*, N.O., Leguminosæ, Muell. Cens., p. 140.

"Indigo."

Baron Mueller considers this plant indigenous in Northern Queensland. It is also a native of the East Indies, and other parts of Asia. Indigo is prepared by throwing bundles of the fresh-cut plants into shallow vats and covering them with water, care being taken to keep them under the surface. After steeping for ten or twelve hours the liquid is run off into another vat, and the plant is beaten with sticks or bamboos from one and a half to three hours, in order to promote the formation of the blue colouring matter, which does not exist already formed in the tissues of the plant, but is formed by the oxidation of other substances contained in them. The colouring matter is then allowed to settle, the precipitation being accelerated by the addition of a small quantity of clean cold water, or lime-water, and the supernatant liquid drawn off and thrown away, while the deposited matter is put into a boiler, and kept at the boiling-point for five or six hours. After this, it is spread upon frames covered
from
1887.) ...wed to drain for twelve or fourteen hours, and
Victoria and South Australi ressed, cut into cubes, stamped
...reasury of Botany.) (See, also,

13. **Erythroxylon australe,**..)

Baron Mueller exhib
Melbourne, 1866, cotton
of this tree. Tints fron *F.v.M.*, (Syn. *Rottlera discolor*, F.v.M.;
Queensland. *...toides*, var., F.v.M.); N.O., Euphorbiaceæ,

14. **Eucalyptus amy**

202. ...e aboriginals of Northern New South Wales.

The capsules of this plant yield a powder which gives a bright yellow dye.

New South Wales and Queensland.

22. **Mallotus phillipensis,** *Muell. Arg.*, (Syn. *Croton phillipensis*, Lam.; *Rottlera tinctoria*, Roxb.; *Echinus phillipensis*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 141.

"Kamala" of India. "Poodgee-poodgera" of the aboriginals of Queensland.

This plant is also a native of tropical Asia. The capsules yield a reddish powder, known in India by the name of "Kamala," and employed by the Hindu silk dyer to yield a red dye of great beauty by boiling with carbonate of soda. Other parts of the plant yield a similar powder, but in much less abundance than on the capsules. The bark is also used for dyeing.

New South Wales and Queensland.

23. **Morinda citrifolia,** *Linn.*, (Syn. *Sarcocephalus cordatus*, Miq.); N.O.. Rubiaceæ, B.Fl., iii, 402 and 423. (Muell., Cens., 74 and 75.)

"Leichhardt's Tree." "Indian Mulberry." (For other botanical synonyms and vernacular names, see "Timbers.")

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with bark from the root of this tree from Queensland. Tints of yellow were obtained.

Queensland and Northern Australia.

24. **Morinda citrifolia,** *Linn.*, (Syn., *M. quadrangularis*, Don.); N.O., Rubiaceæ, B.Fl., iii., 423.

"Indian Mulberry." (For other synonyms, see "Timbers.")

The root yields a yellow, and the bark a red dye. It is used by Polynesians to colour their dresses, and in Madras for dyeing red turbans. The colour is fixed with alum.

Queensland and Northern Australia.

25. **Olearia argophylla,** *F.v.M.*, (Syn. *Aster argophyllus*, Labill.; *Eurybia argophylla*, Cass.); N.O., Compositæ., B.Fl., iii., 470. *Aster argophyllus* in Muell. Cens., p. 78.

"Musk Tree."

A brilliant sap-green has been obtained from this plant by Mr. Bosisto.

Tasmania, Victoria and New South Wales.

26. **Petalostigma quadriloculare,** *F.v.M.*, (Syn. *P. triloculare*, Muell. Arg.; *P.australianum*, Baill.; *Hylococcus sericeus*, R.Br.); N.O., Euphorbiaceæ, B.Fl., vi., 92.

"Crab Tree." "Bitter Bark." (For other vernacular names, see "Timbers.")

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1866, cotton and woollen fabrics dyed with the bark of this tree from Queensland. Brownish-yellows were obtained.

New South Wales to Northern Australia.

27. **Pipturus argenteus,** *Wedd.*, (Syn. *P. propinquus*, Wedd.); N.O., Urticeæ, B.Fl., vi., 185.

"Coomeroo-coomeroo" of the Queensland aboriginals.

A rich brown dye is obtained from the bark. This plant is not endemic in Australia.

New South Wales and Queensland.

28. **Rhizophora mucronata,** *Lam.*, (Syn. *R. Mangle*, Roxb.; *R. Candelana*, Wight. et Arn.); N.O., Rhizophoreæ, B.Fl., ii., 493.

"Mangrove."

The blood-red sap is much used by the natives of Fiji for dyeing their hair. Mixed with the sap of *Hibiscus moschatus*, Linn., it is used for painting crockery by the native potters. (Seemann, *Flora Vitiensis*.)

New South Wales to Northern Australia.

29. **Semecarpus Anacardium,** *Linn.*, (Syn. *S. australasicus*, Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut Tree" of India.

The juice, when mixed with quick-lime, is employed to mark cotton or linen with an indelible mark. It is used for this purpose all over India. When dry, it forms a black varnish much used in India, and, amongst other purposes, it is employed, mixed with pitch and tar, in the caulking of ships. *(Treasury of Botany.)* The unripe fruit is employed for making a kind of ink.

Queensland and Northern Australia.

30. **Sterculia acerifolia,** *A. Cunn.*, (Syn. *Brachychiton acerifolium*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton acerifolium* in Muell. Cens., p. 15.

"Flame Tree." "Lace-bark Tree."

A dye is obtained from the seed-vessels, according to Mr. Guilfoyle.

New South Wales and Queensland.

31. **Symplocos spicata,** *Roxb.*, (Syn. *S. Stawelli*, F.v.M.); N.O., Styraceæ, B.Fl., iv., 292.

The leaves of this tree are used as dyeing in India. (Gamble.)

Northern New South Wales.

32. **Terminalia Catappa,** *Linn.;* N.O., Combretaceæ, Muell., Cens., p. 50.

"Country Almond" (of India).

The bark and leaves yield a black dye. (Gamble.)

Queensland.

33. **Thespesia populnea,** *Corr.*, (Syn. *Hibiscus populneus*, Willd.); N.O., Malvaceæ, B.Fl., i., 221.

The flower-buds and unripe fruits yield a viscid yellow juice, useful as a dye. This plant is not endemic in Australia.

The pollen of *Typha japonica* is used in Japan as a yellow pigment. A similar pigment might, perhaps, be prepared from the Australian species.

Queensland and Northern Australia.

34 **Zanthoxylum (Xanthoxylon) brachyacanthum,** *F.v.M.*, N.O., Rutaceæ, B.Fl., i., 363.

"Satin-wood." "Thorny Yellow-wood."

Baron Mueller exhibited at the Intercolonial Exhibition of Melbourne, 1886, cotton and woollen fabrics dyed with the bark of this tree from Queensland. Brownish-yellows were obtained.

Northern New South Wales and Queensland.

35. **Zieria Smithii**, *Andr.*, (Syn. *Z. lanceolata*, R.Br.; *Boronia arborescens*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 306.

"Turmeric Tree" and "Sandfly Bush." Called "Stinkwood" in Tasmania.

This tree has a yellow inner bark, suitable for dyeing.

All the colonies except South and Western Australia.

TANS.

(FOR SUCH TANS AS ARE KINOS, SEE "KINOS.")

Acacia spp,

"Wattle Barks."

Wattle Barks are often gathered in Australia all the year round, whereas the bark should only be stripped for three or four months in the year; (the months recommended are September, October, November, and December); out of that season there is usually a depreciation of tannin in the bark. In these months, also, the sap usually rises without intermission, and the bark is easily removed from the tree. The impression appears to have prevailed amongst bark-strippers that whenever the bark would strip it possessed full tanning properties, but this is erroneous. After a few days of rain during other seasons of the year, a temporary flow of sap will cause the bark to be easily detached from the trunk, but then it is greatly inferior in quality. The bark obtained from trees growing on lime-stone formations is greatly inferior in tannin to that of trees grown on any other formation. (*Vide Report of the Wattle Bark Board*, Melbourne, 1878.)

Wattle Bark should only be procured from mature trees, *i.e.*, from those whose bark possesses the full natural strength.

It should be purchased in the stick or bundle. "In this form its quality can be more readily judged; but when the supply of mature trees became diminished, nearly all the bark was chopped or ground prior to shipment, good and inferior being bagged together."

For export to England, however, it is perhaps best sent in the form of extract, an enormous saving in freight being effected in this way. The following letter from a well-known London firm of

brokers, which appeared in the *Leather Trades Circular and Review* of the 8th March, 1887, is valuable :—

"In reply to a question as to the best form in which to ship Mimosa (Wattle) Bark, we beg to state that the trade, as a rule, prefer it ground, so long as they can be sure it is not adulterated. Some few, however, cannot be satisfied unless they grind it themselves.

"We should recommend shipments of well ground, with a few parcels chopped or crushed *in bags*, but as we know that freight is heavier on the latter, and buyers expect a reduction of from 10s. to 20s. per ton to cover cost of grinding, the former will generally be most satisfactory to shippers. We think that the strength is better preserved in the chopped than in the ground, but there is nothing we can suggest as an improvement on the best standard marks of Adelaide ground.

"If shipments of chopped be made it should on no account be shot loose in the ship's hold."

Owing to the greedy and indiscriminating way in which Wattle Barks have been gathered, and the moist condition in which they have often been shipped, purchasers in England, finding the quality variable, have not entered into its regular employment as largely as might have been expected.

Wattles have been extensively planted by at least three Australian Governments, those of South Australia, Victoria, and New South Wales, especially the former. It is even yet too early to predict whether Wattle-planting by Government (except in South Australia) will be a profitable commercial enterprise. In New South Wales, at least, a large number of Wattles have been planted in the narrow strips of ground between the fences and the railway lines. But the cost of keeping the young trees free from grass is very great, the cost of planting out in such an extended fashion also very great, and watering the young plants till they are established is out of the question. The telegraph line repairers have also killed a large number of the Wattles which were most thriving, because it was feared that they might interfere with the wires. Altogether, the difficulties in the way of growing Wattles along the railway lines are so considerable that the enter-

prise will probably be entirely abandoned, or confined to extremely favourable localities.*

"Messrs. Borrow and Haycroft have established at Echunga, South Australia, a manufactory of *tannage*, which must be of great interest to all colonists, and from the methods employed is almost pharmaceutical. About 10,000 tons of Wattle Bark are sent annually from South Australia alone, and it is calculated that the waste in stripping is about four times this amount. The new factory converts the branches too small to pay for stripping into a strong fluid extract called *tannage*, which contains water 60 per cent., and soluble tanning 38.2 per cent., according to an analysis by Mr. G. H. Hodgson of samples from the first 80 tons recently shipped to England. The Wattle *trash* yields 12 to 16 per cent. of tannage; two men can often cut and load five tons, and the waggons can bring in two loads a day, equal to five or six tons; and at the price (£1 a ton) which the firm is paying for thinnings, and tops, and branches, so much is offering that the patentees are obliged to distribute their order. The *trash* is tied up in large bundles and carted into the factory. It is there weighed, close beside the machine which cuts it up into *chaff*. This machine is very much like an ordinary steam-plane, the chisels revolving at a high speed, and cutting through 2½-inch saplings quite readily. The chips are shovelled into large wooden hoppers, into which steam is introduced from a large Cornish boiler. There are three steam-heated vats, and the liquor is transferred from one to the other, pumped into elevated tanks, and thence allowed to flow from a tap on to steam-heated evaporating pans about thirty or forty feet in length. The evaporation is so rapid that in traversing the pans from the one end to the other the liquid is converted into a thick, tenacious, treacly extract. At the end of the pans it flows into a cistern, and thence by a kind of treacle-gate into the casks, each of which will hold about 10 cwt. All that now remains to be done is paste on a label, put in a bung, weigh the cask, and send it off to market. In the process of evaporation a certain portion of the tannic acid

* See also a paper "On the Export and Consumption of Wattle Bark, and the Process of Tanning," by James Mitchell (*Proc. R.S. Van Diemen's Land*, 1851). The subject of Extracts is here dealt with.

is destroyed. The plant can be easily moved from place to place. It does not pay to cart the trash far, but a few square miles of wattle country will keep a factory going. The utilisation of thinnings allows the cultivation of the tree thickly on waste ground, and to begin cutting the third year. European tanners are quite accustomed to the use of such extracts, but it is said that it will be very hard to introduce it into the colonial tanneries." (*Chemist and Druggist*, 1886.)

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1. **Acacia aneura**, *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 402.

"Mulga." (For other vernacular names, see "Timbers.")

A specimen of the bark of this tree from Ivanhoe, N.S.W., yielded the author 10 per cent. of extract, and 4.78 per cent. of catechu-tannic acid. A narrow-leaved variety from the same neighbourhood yielded 20.72 per cent. of extract, and 8.62 per cent. of catechu-tannic acid.* (*Proc. R.S., N.S.W.*, 1887, p. 32.)

All the colonies except Tasmania.

2. **Acacia aulacocarpa**, *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 410.

"Hickory Wattle."

This tree yields a tan-bark, used in Queensland to some extent.

Central and Northern Queensland.

3. **Acacia binervata**, *DC.*, (Syn. *A. umbrosa*, A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 390.

"Black Wattle," or "Hickory." "Myimbarr" of the aboriginals of Illawarra (New South Wales).

The bark is used by tanners, though it is not so rich as that of *A. decurrens*. (W. Dovegrove.) Nevertheless, it is a very valuable bark; specimens from Cambewarra, N.S.W., yielded the author 58.03 per cent. of extract, and 30.4 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 90.)

New South Wales and Queensland.

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* *Important Memorandum.* The percentages of tannic acid determined by the author, and recorded in *Proc. R.S., N.S.W.*, are all calculated upon the bark *dried at* 100°C

4. **Acacia calamifolia,** *Sweet,* (Syn. *A. pulverulenta,* A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 339.

"Willow," or "Broom Wattle." "Wallowa" of the aboriginals at Lake Hindmarsh Station (Victoria).

An excellent tan-bark. A sample in the Technological Museum contains 20.63 per cent. of tannin, according to an analysis by Mr. Thomas, of Adelaide.

The dry interior of South Australia, Victoria, New South Wales and Queensland.

5. **Acacia colletioides,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 325.

"Wait-a-while" (a delicate allusion to the predicament of a traveller desirous of penetrating a belt of it).

Some bark from a very old tree was examined by the author, and yielded 10.56 per cent. of extract, and 4.4 per cent. of catechu-tannic acid (*Proc. R.S., N.S.W.*, 1887, p. 8).

New South Wales, Victoria, South and Western Australia.

6. **Acacia Cunninghami,** *Hook.*, N.O., Leguminosæ, B.Fl., ii., 407.

"Black Wattle." "Bastard Myall" of Northern New South Wales. "Kowarkul" of the Queensland aboriginals.

The following is an analysis of this bark:—Tannin, 9.13 per cent.; extract, 16.15 per cent. (*Queensland Comm., Col. and Indian Exh., 1886.*)

Central New South Wales to Central Queensland.

7. **Acacia dealbata,** *Link.*, (Syn. *A. irrorata,* Sieb.); N.O., Leguminosæ, B.Fl., ii., 415.

"Silver Wattle."

An excellent tanning material. A sample in the Technological Museum of Sydney contains 29.25 per cent. of tannin. The analysis was by Mr. Thomas, of Adelaide. Some specimens from Quiedong, near Bombala, N.S.W., yielded the author 29.86 per cent. of extract, and 21.22 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 92.) The bark of this tree is much thinner and inferior to the Black Wattle (*A. decurrens,* var. *mollisima),* in quality. It is chiefly employed for lighter leather. This tree is distinguished from the Black Wattle by the silvery, or

rather, ashy hue of its young foliage. It flowers early in spring, ripening its seeds in about five months, while the Black Wattle blossoms late in spring, or at the beginning of summer, and its seeds do not mature before about fourteen months. (Mueller.)

South Australia, Victoria, Tasmania, New South Wales and Queensland.

8. **Acacia decurrens,** *Willd.;* N.O., Leguminosæ, B.Fl., ii., 214.

"Green Wattle" of the older colonists of New South Wales. "Black Wattle" and "Silver Wattle" of the colonists. "Wat-tah" of the aboriginals of the counties of Cumberland and Camden (New South Wales).

The following analysis of this bark was given by the Queensland Commissioners at the Colonial and Indian Exhibition of 1886:—Tannin, 15.08 per cent.; extract, 26.78 per cent.

It is an important tan-bark in most of the colonies, and as it grows in the poorest soils (almost pure sand) every encouragement should be given to its cultivation. A specimen of this bark from Ryde, near Sydney, yielded the author 48.74 per cent. of extract, and 32.33 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 93.)

This Acacia is being grown successfully on a somewhat extensive scale at Coonoor, in India. It thrives pretty well at Ootacamund, but does not bear fruit there.

South Australia, Victoria, Tasmania, New South Wales and Southern Queensland.

9. **Acacia decurrens,** var. **mollis,** *Willd.*, (Syn. *A. mollissima*, Willd.); N.O., Leguminosæ, B.Fl., ii., 415.

"Black Wattle" of the older New South Wales colonists. "Silver Wattle." "Garrong" of some aboriginals of Victoria, and "Warra-worup" by those at the aboriginal station, Coranderrk.

Since the subjoined was written, Baron Mueller has again conceded specific rank to this so-called variety. "The bark, rich in tannin, renders this tree highly important. The English price of the bark ranges generally from £8 to £11. In Melbourne it averages about £5 per ton. It varies, so far as my experiments have shown, in its tannin, from 30 to 54 per cent. (*sic*) in bark

artificially dried. In commercial bark the percentage is somewhat less, according to the state of its dryness—it retains about 10 per cent. of moisture. 1¼lb. of Black Wattle Bark gives 1lb. of leather, whereas 5lbs. of English oak bark are requisite for the same results; but the tanning principle of both is not absolutely identical. Melbourne tanners consider a ton of Black Wattle Bark sufficient to tan 25 to 30 hides; it is best adapted for sole leather, and other so-called heavy goods. The leather is fully as durable as that tanned with oak bark, and nearly as good in colour. Bark carefully stored for a season improves in tanning power 10 to 15 per cent. From experiments made it appears that no appreciable difference exists in the percentage of tannin in Wattle Barks, whether obtained in the dry or in the wet season. As far back as 1823 a fluid extract of Wattle Bark was shipped to London, fetching then the extraordinary price of £50 per ton, one ton of bark yielding 4cwt. of extract of tar consistence (Simmonds), thus saving much freight and cartage. The cultivation of the Black Wattle is extremely easy, being effected by sowing, either broadcast or in rows. Seeds can be obtained in Sydney or Melbourne, at 5s. per lb., which quantity contains from 30,000 to 50,000 seeds; they are known to retain their vitality for several years. Seeds should be soaked in warm water before sowing. Any bare, barren, unutilised place might be most remuneratively sown with this Wattle; the return would be in from five to ten years. Full-grown trees, which supply also the best quality, yield as much as 1cwt. of bark. Mr. Dickinson states that he has seen 10cwt. of bark obtained from a single tree of gigantic dimensions at Southport, Queensland. A quarter of a ton of bark was obtained from one tree at Tambo, Queensland, without stripping all the limbs. The height of this tree was sixty feet, and the stem two feet in diameter The rate of growth is about one inch in diameter of stem annually. It is content with the poorest and driest, or sandy soils, although in more fertile ground its growth is more rapid. (Mueller, *Select Extra-tropical Plants.*)

Eastern South Australia, through Victoria and New South Wales to Southern Queensland. The only form of this species in Tasmania.

10. **Acacia falcata**, *Willd.*, (Syn. *A plagiophylla*, Spreng.; *Mimosa obliqua*, Wendl.); N.O, Leguminosæ, B.Fl., ii., 361.

"Hickory." "Lignum-vitæ." "Sally." "Wee-tjellan" of the aboriginals of Cumberland and Camden (New South Wales).

Yields a good tanning bark.

Central New South Wales to Southern Queensland.

11. **Acacia flavescens**, *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 391.

This bark contains 10.2 per cent. of tannin. (Staiger.)

Queensland.

12. **Acacia glaucescens**, *Willd.*, (Syn. *A. homomalla*, Wendl.; *A. cinerascens*, Sieb.; *A. leucadendron*, A. Cunn.; *Mimosa binervis*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 91.

A "Myall," "Brigalow," &c. (For other vernacular names, see "Timbers.")

Bark from near Bombala, N.S.W., yielded the author 14.29 per cent. of extract, and 8.10 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 91.) The leaves (*loc. cit.*, p. 260) yielded 30.96 per cent. of extract, and 2.874 per cent. of tannic acid.

From Victoria to Queensland.

13. **Acacia harpophylla**, *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 389.

"Brigalow."

This tree yields a considerable amount of tan-bark.

Central Queensland.

14. **Acacia homalophylla**, *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 383.

"Narrow-leaved Yarran." A "Myall." (For other vernacular names, see "Timbers.")

The bark from an oldish tree has been examined by the author, with the following result:—Extract, 21.51 per cent., and tannic acid 9.06 per cent. (*Proc. R.S., N.S.W.*, 1887, p. 189.)

New South Wales and Queensland.

23. **Acacia penninervis**, *Sieb.*, (Syn. *A. impressa*, Lindl.); N.O., Leguminosæ, B.Fl., ii., 362.

"Blackwood." Called "Hickory" in the Braidwood district of New South Wales.

The bark contains 17.9 per cent. of tannic acid, and 3.8 per cent. of gallic acid. (Mueller.) The following analysis is given by the Queensland Commissioners, Colonial and Indian Exhibition, 1886 :—Tannin, 14.49 per cent.; extract, 33.06 per cent. Specimens from Monga, near Braidwood, N.S.W., yielded the author (*a*) from the bark of the twigs, 22.88 per cent. of extract, and 16.24 per cent. of catechu-tannic acid; (*b*) from the bark of the trunk, 45.5 per cent. of extract, and 16.96 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.* 1887, p. 30.)

Tasmania, Victoria, New South Wales and Queensland.

24. **Acacia podalyriæfolia**, *A. Cunn.*, (Syn. *A. Fraseri*, Hook.; *A. Caleyi*, A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 374.

"Silver Wattle."

The bark is used in tanning, giving a light colour to leather. The following analysis is given by the Queensland Commissioners, Colonial and Indian Exhibition, 1886 :—Tannin, 12.40 per cent.; extract, 29.50 per cent.

Northern New South Wales and Queensland.

25. **Acacia polystachya**, *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 407.

The following is an analysis of this bark :—Tannin, 7.59 per cent. (Staiger.)

Queensland and Northern Australia.

26. **Acacia pycnantha**, *Benth.*, (Syn. *A. petiolaris*, Lehm.; *A. falcinella*, Meissn.); N.O., Leguminosæ, B.Fl., ii., 365.

"Black, Green, or Golden Wattle." "Broad-leaf Wattle." "Witch" of the aboriginals of Lake Hindmarsh Station (Victoria).

One of the richest tanning barks in the world. A sample in the Technological Museum contains 33.5 per cent. of tannin, according to an analysis by Mr. Thomas, of Adelaide. This tree, which attains a maximum height of about thirty feet, is second per-

haps only to *A. decurrens* in importance for its yield of tanner's bark; the quality of the latter is even sometimes superior to that of the Black Wattle (*A. decurrens*, var. *mollissima*), but its yield is less, as the tree is smaller and the bark thinner. It is of rapid growth, content with almost any soil, but is generally found in poor sandy ground near the sea-coast, and thus also important for binding rolling sand. (Mueller, *Select Extra-tropical Plants.*)

In part iii. of the *Forest Flora of South Australia*, by J. E. Brown, are some very interesting analyses of the bark of this tree by Mr. G. A. Goyder, Superintendent of the Crown Lands Laboratory at Adelaide. The table is given herewith. The localities are all South Australian.

Locality where grown, elevation, &c.	Character of soil upon which grown.	Age of tree	Weight of bark from each tree	Thickness of bark.	Portion of tree from which taken.	Percentage of tannin.	Total extractive matter.
		Yrs.	lbs.	in.			
Government Farm—Belair, elevation 1000 ft.	Sandy loam, with clay sub-soil ...	6	45	0.22	From trunk wood and bark	34.0	55.3
Do.	Do.	6	—	—	of twigs	5.1	20.5
Do.	Do.	6	—	—	Leaves.	3.5	27.1
Torrens Island—Almost sea-level ..	Deep sandy soil ...	5	58	0.23	Trunk.	25.2	46.5
Do.	Do.	5	—	0.04	Twigs.	21.7	40.8
Do.	Do.	5	—	—	Leaves.	6.5	35.5
Bundaleer Forest—Elevation, 1,800 ft.	Ferruginous loam, with clay sub-soil	7	128	0.20	Trunk.	31.4	49.9
Do.	Do.	7	—	0.05	Twigs.	22.3	45.6
Do.	Do.	7	—	—	Leaves.	4.9	34.4
Semaphore—20 ft. above sea-level	Deep sand	abt. 30	307	0.18	Trunk.	25.8	42.6
Brighton—20 ft. to 30 ft. above sea-level	Clay soil	6	—	0.21	Trunk.	28.7	53.4
Do.	Do.	6	—	0.03	Twigs.	25.3	41.6
Do.	Do.	6	—	—	Leaves.	3.6	31.9
Mount Gambier	Calcareous sand ...	7	—	0.13	Trunk.	31.7	52.0

The dried leaves of this species furnish as much as 15.16 per cent. of tannic acid. (Mueller and Rummel.)

South Australia Victoria and Southern New South Wales.

27. **Acacia retinodes**, *Schlecht.;* N.O., Leguminosæ, B.Fl., ii., 362.

Yields a good tan-bark.

South Australia and Victoria.

28. **Acacia rigens**, *A. Cunn.*, (Syn. *A. chordophylla*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 337.

"Nealie," or "Needle Bush."

Bark from an old tree, from near Hay, N.S.W., yielded the author 19.05 per cent. of extract, and 6.26 per cent. of catechu-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 88.)

South Australia, Victoria and New South Wales.

29. **Acacia salicina**, *Lindl.*, (Syn. *A. ligulata*, A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 367.

"Cooba," or "Koubah." "Native Willow." "Motherumba."

An excellent tan-bark.

All the colonies except Tasmania.

30. **Acacia saligna**, *Benth. non Wendl.*, (Syn. *A. leiophylla*, Benth; *Mimosa saligna*, Labill.); N.O., Leguminosæ, B.Fl., ii., 364.

In South-west Australia it is the principal source of tan-bark. It contains nearly 30 per cent. of tannin.

Western Australia.

31. **Acacia sentis**, *F.v.M.*, (Syn. *A. Victoriæ*, Benth.); N.O., Leguminosæ, B.Fl., ii., 360.

A specimen of bark from Ivanhoe, N.S.W., yielded the author 18.02 per cent. of extract, and catechu-tannic acid 6.32 per cent. (*Proc. R.S., N.S.W.*, 1887, p. 29.)

In all the colonies except Tasmania.

32. **Acacia subporosa**, *F.v.M.*, *supporosa* in Muell., Fragm., iv., 5; N.O., Leguminosæ, B.Fl., ii., 382.

This bark yielded tannic acid 6.6 per cent., and gallic acid 1.2 per cent. (Mueller.)

Victoria and New South Wales.

33. **Acacia vestita**, *Ker*, N.O., Leguminosæ, B.Fl., ii., 375.

Bark from near Bombala, N.S.W., yielded the author 50.82 per cent. of extract, and 27.96 per cent. of catechu-tannic acid (*Proc. R.S., N.S.W.*, 1887, p. 89). The leaves (*loc. cit.* p. 258)

yielded 40.18 per cent. of extract, and 15.18 per cent. of tannic acid.

Southern New South Wales and Northern Victoria.

34. **Albizzia lophantha**, *Benth.*, (Syn. *Acacia lophantha*, Willd.; *Mimosa distachya*, Vent. non. Cav.; *M. elegans*, Andr.); N.O., Leguminosæ, B.Fl., ii., 421.

The bark contains 8 per cent. of tannin. (Mueller.) This tree is naturalised on the Nilgiris. (Beddome, *Flora Sylvatica of Southern India.*)

Western Australia.

35. **Alphitonia excelsa**, *Reissek*, (Syn. *Colubrina excelsa*, Fenzl.); N.O., Rhamneæ, B.Fl., i., 414.

"Red Ash." "Mountain Ash." "Leather-jacket." (For aboriginal names, see "Timbers.")

The bark of this tree is occasionally used for tanning.

New South Wales, Queensland and Northern Australia.

36. **Atherosperma moschata**, *Labill.*, N.O., Monimiaceæ, B.Fl., v., 284.

"Sassafras."

From the bark of this tree the following tannic acid may be prepared. It only possesses scientific interest.

Atherosperma Tannin. Precipitate the decoction of the bark with acetate of lead, treat the precipitate with acetic acid, precipitate the filtrate by ammonia, decompose the precipitate suspended in water by hydrogen sulphide, and evaporate the filtrate. It is a yellow liquid of faintly acid and astringent taste; it greens ferric salts. (Mueller.)

Tasmania, Victoria and Southern New South Wales.

37. **Banksia integrifolia**, *Linn., fil.*, (Syn. *B. spicata*, Gaertn.; *B. oleifolia*, Cav.; *B. macrophylla*, Link.; *B. compar*, R.Br.); N.O., Proteaceæ, B.Fl., v., 554.

"Coast Honeysuckle." "Beef-wood." (For aboriginal names, see "Timbers.")

The bark of this and other species of *Banksia* are occasionally used for tanning. The author has analysed a sample of this bark,

obtained from the neighbourhood of Sydney, and has found 10.825 per cent. of tannic acid, with 14.2 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 203.)

Victoria, New South Wales and Queensland.

38. **Banksia serrata,** *Linn., f.*, (Syn. *B. conchifera*, Gærtn.; *B. mitis*, Knight; *B. dentata*, Wendl.; *B. media*, Hook, f., non R.Br.); N.O., Proteaceæ, B.Fl., v., 556.

"Honeysuckle." Formerly called "Wattung-urree" by the aboriginals of Cumberland and Camden (New South Wales).

The bark of this tree has yielded nearly 10.8 per cent. of tannic acid, and .7 per cent. of gallic acid. (Mueller.) The author has examined a sample of bark of this species obtained in the neighbourhood of Sydney. He found 27.38 per cent. of extract, of a very deep colour, and no less than 23.25 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 204.)

Tasmania, Victoria and New South Wales.

39. **Bruguiera Rheedii,** *Blume*, (Syn. *B. australis*, A. Cunn.; *B. Rumphii*, Blume); N.O., Rhizophoreæ, B.Fl., ii., 494. *B. Rheedi* and *B. gymnorrhiza* are united by some authors.

"Red Mangrove." "Kowinka" of the Queensland aboriginals.

The following is an analysis of this bark:—Tannin, 19.48 per cent.; extract, 37.91 per cent. (Staiger.) Another experiment gave 18.2 per cent. of tannin. It is used for tanning chiefly in India.

Queensland and North Australia.

40. **Casuarina glauca,** *Sieb.*, (Syn. *C. torulosa*, Miq. non Ait.); N.O., Casuarineæ, B.Fl., vi., 196.

"Belar," "Billa," or "Bull Oak." (For other vernacular names, see "Timbers.")

The author examined a specimen of bark of this species brought from Ivanhoe, New South Wales. It contained 17.2 per cent. of extract, and 11.58 per cent. of tannic acid. (*Proc. R.S.*, 1887, p. 205.)

South Australia, Victoria, New South Wales and Queensland.

41. **Casuarina suberosa,** *Otto and Dietr.*, (Syn. *C. leptoclada*, Miq.; *C. mœsta*, F.v.M.); N.O., Casuarineæ, B.Fl., vi., 197.

This tree has the following colonial names:—"Erect She-Oak." "Forest Oak." "Swamp Oak." "River Black Oak." "Shingle Oak." "Beef-wood." "Dahl-wah" is an aboriginal name.

The barks of *Casuarinas* are more or less astringent, and are occasionally used for tanning. In India this astringency is availed of for medicinal purposes, and less frequently in Australia.

Tasmania, Victoria, New South Wales and Queensland.

42. **Cedrela toona,** *Roxb.*, (Syn. *Cedrela australis*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 386. *C. australis* in Muell. Cens., p. 9.

Ordinary "Red Cedar." (For aboriginal names, see "Timbers.")

This bark contains a considerable quantity of tannin, which produces a purplish leather. (Fawcett.) It is occasionally used for tanning in India.

New South Wales and Queensland.

43. **Elæocarpus grandis,** *F.v.M.;* N.O., Tiliaceæ, B.Fl., i., 281.

"Blue Fig." "Brisbane Quandong" (owing to the blue fruits being eaten by children and aboriginals). By the latter it is frequently called "Calhun," or "Callangun."

The author has examined this bark for tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 182.) That yielded by a tree cultivated in Sydney gave 21.566 per cent. of extract to water, and 10.28 per cent. of tannic acid. It will be interesting to compare the percentages of tannic acid found by Mr. Skey in two New Zealand species of this genus. *E. dentatus*, Vahl. ("Hinau"), gave 21.8 per cent., and *E. Hookerianus*, Raoul, 9.8 per cent.

Northern New South Wales and Queensland.

44. **Eremophila longifolia,** *F.v.M.* (Syn., *Stenochilus longifolius*, R.Br.; *S. salicinus*, Benth.; *S. pubiflorus*, Benth.); N.O., Myoporineæ, B.Fl., v., 23.

"Emu Bush," owing to emus feeding on the seeds of this and other species. "Berrigan" of the aboriginals.

The author has examined the leaves and bark of this small tree for tannic acid, with the following results:—*Leaves*, 9.705 per cent. of tannic acid, and 42.92 per cent. of extract; *Bark*,

51. **Eucalyptus cosmophylla,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 225.

The ordinarily dry leaves gave 13 per cent. of tannin according to a solitary experiment; equal to nearly 15 per cent. in absolutely dry leaves. (Mueller and Rummel.)

South Australia.

52. **Eucalyptus doratoxylon,** *F.v.M.;* N.O., Myrtaceæ, B.Fl., iii., 249.

"Spearwood."

Mueller and Rummel obtained 7.01 per cent. of tannic acid in the dried leaves.

Western Australia.

53. **Eucalyptus globulus,** *Labill.;* N.O., Myrtaceæ, B.Fl., iii., 225.

The well-known "Blue Gum." (For other vernacular names and synonyms, see "Timbers.")

This bark contains 4.84 per cent. of kino-tannic acid. (Mueller and Hoffmann.) Count Maillard de Marafy has suggested that the leaves of this species can be used as a substitute for Sumach. "Leaves of *E. globulus*, taken from a plantation near Alexandria, and pulverised like Sumach, when used upon cotton and wool in the same proportion as the best Sicilian Sumach, gave an intense black that left nothing to be desired."

Tasmania, Victoria and Southern New South Wales.

54. **Eucalyptus goniocalyx,** *F.v.M.;* (Syn., *E. elaeophora*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 229.

"Spotted Gum." (For other vernacular names, see "Timbers.")

This bark contains 4.12 to 4.62 per cent. of kino-tannic acid. (Mueller and Hoffmann.)

Victoria and New South Wales.

55. **Eucalyptus Gunnii,** *Hook. f.*, (Syn. *E. ligustrina*, Miq.; *E. acervula*, Hook. f.); N.O., Myrtaceæ, B.Fl., iii., 246.

"Cider Gum" (of Tasmania). (For other vernacular names, see "Timbers.")

The bark contained 3.44 per cent. of tannin as the result of one experiment. (Mueller.) The author has examined the barks of two varieties of this species—(*a*) "Flooded Gum" or "Bastard Gum," and (*b*) "Red Gum." Both are from near Bombala, N.S.W., the former yielded 19.4 per cent. of extract, and 9.45 per cent. of kino-tannic acid, while the latter yielded 20.84 per cent. of extract, and 11.35 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 86.) Leaves (*loc. cit.*, 272-3) yielded (*a*) 41.08 per cent. of extract, and 8.28 per cent. of tannic acid; (*b*) 40.61 per cent. of extract, and 16.59 per cent. of tannic acid.

Tasmania, the extreme south-eastern portion of South Australia, thence to Gippsland and into New South Wales as far as Berrima.

56. **Eucalyptus hæmastoma,** *Smith*, (Syn. *E. signata*, F.v.M.; *E. falcifolia*, Miq.; and incl. *E. micrantha*, DC.); N.O., Myrtaceæ, B.Fl., iii., 212.

"Scribbly Gum." (For other vernacular names, see "Timbers.")

This bark is occasionally used for tanning. Leaves of this species yielded the author 47.19 per cent. of extract, and 11.27 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 267.)

Illawarra (New South Wales) to Wide Bay (Queensland).

57. **Eucalyptus hemiphloia,** *F.v.M.*, (Syn. *E. albens*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 216.

"Gum-topped Box." (For other vernacular names, see "Timbers.")

One of the barks occasionally used for tanning by settlers.

Eastern South Australia, Victoria, New South Wales and Southern Queensland.

58. **Eucalyptus leucoxylon,** *F.v.M.*, (Syn. *E. sideroxylon*, A. Cunn.); N.O., Myrtaceæ, B.Fl., iii., 209.

"Ironbark." (For the other numerous vernacular names, see "Timbers.")

The bark of this tree contains 21.94 per cent. of tannic acid. (Mueller.) It is hence useful as a tanning material, but only for inferior leather, as the extractive substance of the bark imparts a dark coloration, and also seems to impair the tanning process. The Sydney fishermen sometimes tan their sails and nets with it,

but they then become dark-coloured and hard. "The dried leaves yielded 9½ per cent. of tannic acid." (Mueller and Rummel.)

Spencer's Gulf (South Australia), through Victoria and New South Wales to Southern Queensland.

59. **Eucalyptus macrorrhyncha,** *F.v.M.*, (Syn. *E. acervula*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 207.

"Stringybark." (For other vernacular names, see "Timbers.")

This bark contains 11.12 to 13.41 per cent. of kino-tannic acid. (Mueller and Hoffman.) The leaves have been examined by the author, and found to yield 40.18 per cent. of extract, and 10.13 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 265.)

Victoria and New South Wales.

60. **Eucalyptus maculata,** *Hook. f.*, (Syn. *E. variegata*, F.v.M.; *E. peltata*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 254 and 258.

"Spotted Gum."

A tan-bark, occasionally employed. The author obtained 9.74 per cent. of tannic acid, and 20.865 per cent. of extract from a sample of this bark obtained from Cambewarra, New South Wales. (*Proc. R.S., N.S.W.* 196.) The leaves (*loc. cit.*, p. 274) yielded 28.32 per cent. of extract, and 5.263 per cent. of tannic acid.

Port Jackson to Central Queensland.

61. **Eucalyptus melliodora,** *A. Cunn.*, (Syn. *E. patentiflora*, Miq., non F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 210.

"Yellow Box." (For other vernacular names, see "Timbers.")

This bark contains 4.03 per cent. of kino-tannic acid. (Mueller and Hoffmann.) Leaves of this species yielded the author 49.8 per cent. of extract, and 7.89 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 266.)

Victoria, New South Wales and Queensland.

62. **Eucalyptus microcorys,** *F.v.M.*; N.O., Myrtaceæ, B.Fl., iii., 212.

"Tallow-wood." "Turpentine." "Tee."

A settlers' tan-bark.

Northern coast districts of New South Wales, to Cleveland Bay, Queensland.

63. **Eucalyptus obliqua,** *L'Hérit.*, (Syn., *E. gigantea*, Hook. f.; *E. falcifolia*, Miq., (partly); *E. nervosa* F.v.M.; and incl. *E. heterophylla*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 204.

A "Stringybark." (For other vernacular names, see "Timbers.")

The bark contains only from 2.5 to 4.19 per cent. of kino-tannin. (Mueller.) Leaves of this species, from Cambewarra, New South Wales, yielded the author 41.13 per cent. of extract, and 17.2 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 264.)

Southern New South Wales, Victoria, Tasmania and South Australia.

64. **Eucalyptus odorata,** *Behr*, (Syn., *E. porosa*, Miq.; *E. cajuputea*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 125.

"White Box." (For other vernacular names, see "Timbers.")

Leaves from a variety of this species, obtained from near Eden, New South Wales, yielded the author 40.19 per cent. of extract, and 6.775 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887., 268.)

South Australia, Victoria and New South Wales.

65. **Eucalyptus piperita,** *Smith*, (Syn. *E. acervula*, Sieb.); N.O., Myrtaceæ, B.Fl., iii., 207.

"Peppermint." (For other vernacular names, see "Timbers.")

Leaves from this species, locally known as "Messmate" and "Narrow" or "Almond-leaved Stringybark," at Brooman, Clyde River, New South Wales, yielded the author 34.08 per cent. of extract, and 12.59 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, p. 265.)

Victoria, New South Wales and Queensland.

66. **Eucalyptus polyanthema,** *Schauer*, N.O., Myrtaceæ, B.Fl., iii., 213.

"Box." (For synonyms and vernacular names, see "Timbers.")

This bark contains 3.97 per cent. of kino-tannic acid. (Mueller and Hoffmann.) Leaves of this species yielded the author 29.69 per cent. of extract, and 1.881 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 267.)

Victoria and New South Wales.

67. **Eucalyptus resinifera,** *Smith*, (Syn. *E. spectabilis*, F.v.M.; *E. pellita*, F.v.M.; *E. Kirtoniana*, F.v.M.; *E. hemilampra*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 245.

"Red" or "Forest Mahogany." (For other vernacular names, see "Timbers.")

Used occasionally as a tan-bark.

New South Wales and Queensland.

68. **Eucalyptus robusta,** *Smith*, (Syn. *E. rostrata*, Cav. non Schlecht.); N.O., Myrtaceæ, B.Fl., iii., 228.

"White," or "Swamp Mahogany." (For other vernacular names, see "Timbers.")

Leaves of this species, obtained from Brooman, Clyde River, New South Wales, yielded the author 34.7 per cent. of extract, and 12.069 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 269.)

New South Wales.

69. **Eucalyptus rostrata,** *Schlecht.*, N.O., Myrtaceæ, B.Fl., iii., 240.

"Red Gum." (For synonyms and vernacular names, see "Timbers.")

Some insect galls from saplings, causing the abortion of leaf-buds and flower-buds, have been examined by the author. They were more or less perforate, the perfect insect having in most cases taken its departure. They were more or less weather-worn and pulverulent. The colour yellowish to a dirty yellowish-brown. Average diameter about ½ in. They yielded 70.22 per cent. of extract, and 43.4 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 85.)

Baron Mueller gives the percentage of tannic acid in the bark at 8.22. Leaves of this species yielded the author (*loc. cit.*, p. 271), 40.8 per cent. of extract, and 6.62 per cent. of kino-tannic

acid. These leaves were previously dried at 100° C., as usual. Mueller and Rummel found 4.68 per cent of tannic acid in the "fresh leaves." Making allowance for moisture, the results closely approximate.

In all the colonies.

70. **Eucalyptus siderophloia,** *Benth.*, (Syn. *E. resinifera*, A. Cunn., non Smith; *E. persicifolia*, DC.; and prob. *E. fibrosa*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 220.

"Ironbark." (For other vernacular names, see "Timbers.")

This bark, which contains more or less kino disseminated through it, is occasionally used for tanning. Sometimes the Sydney fishermen use it for tanning their sails and nets, but it discolours them.

At p. 193 (*Proc. R.S., N.S.W.*, 1887) the author describes an examination of the bark of a sapling of this species. The bark differs from that described (*loc. cit.*, p. 39, see "Kinos"), in containing but traces of kino visible to the naked eye, and consisting of the whole thickness of the bark. The complete difference will be apparent from the following description of the bark now referred to. It reminds the author very strongly of virgin cork, more so, in fact, than any other specimen of Eucalyptus bark examined by him up to the present time. It is deeply fissured, light (though not quite so light as cork bark), and these particular specimens certainly might be used as floats for fishermen's nets. It is very soft and elastic, and can easily be indented, and even torn away by the finger-nail. In a word, it is simply inferior cork. Its outer surface has nothing of the hardness characteristic of Ironbarks, though it possesses their rugged, furrowed appearance. Prevailing colour, light grey. The corky portion is readily detachable, and about an inch in thickness. It yields 14.2 per cent. of extract, and 6.702 per cent. of kino-tannic acid. Leaves of this yielded (*loc. cit.*, p. 269) 22.93 per cent. of extract, and 5.95 per cent. of tannic acid.

Southern Queensland, south to Port Jackson.

71. **Eucalyptus Sieberiana,** *F.v.M.* (Syn., *E. virgata*, Sieb.); N.O., Myrtaceæ, B.Fl., iii., 202.

"Mountain Ash." "Cabbage Gum." (For other vernacular names, see "Timbers.")

A specimen of kino from near Braidwood, N.S.W., yielded the author 95.04 per cent. of extract, and 36.96 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 37.) The leaves (*loc. cit.*, p. 262) yielded 32.31 per cent. of extract, and 2.389 per cent. of tannic acid.

In all the colonies except Queensland and Western Australia.

72. **Eucalyptus stellulata,** *Sieb.*, N.O., Myrtaceæ, B.Fl., iii., 200.

"Box," "Black Sally," &c. (For vernacular names and botanical synonyms, see "Timbers.")

A specimen of bark from near Braidwood, N.S.W., examined by the author, yielded 27.64 per cent. of extract, and 12.86 per cent. of kino-tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 35.) The leaves (*loc. cit.*, p. 261) yielded 42.14 per cent. of extract, and 16.62*per cent. of tannic acid.

Victoria and New South Wales.

73. **Eucalyptus Stuartiana,** *F.v.M.*, (Syn. *E. persicifolia*, Miq., non Lodd.; *E. Baueriana*, non Schauer; *E. falcifolia*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 243 (partly).

"Woolly Butt." (For the numerous other vernacular names of this tree, see "Timbers.")

The bark contains 4.6 per cent. of tannic acid, and .7 per cent. of gallic acid (Mueller). The author obtained 5.25 per cent. of tannic acid, and 15.39 per cent. of extract in a sample from near Bombala, New South Wales. (*Proc. R.S., N.S.W.*, 1887, 195.) The leaves yielded (*loc. cit.*, p. 271) 42.74 per cent. of extract, and 10.158 per cent. of tannic acid.

Tasmania, Victoria, New South Wales and Queensland.

74. **Eucalyptus viminalis,** *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 239.

"Manna Gum." "Ribbony Gum." (For other vernacular names, see "Timbers.")

This bark contains 4.88 to 5.97 per cent. of kino-tannic acid (Mueller and Hoffmann); the latter being obtained from the bark

of a young tree. The author has found 7.504 per cent. of tannic acid, and 18.65 per cent. of extract in a sample obtained from the neighbourhood of Bombala, New South Wales. (*Proc. R.S., N.S.W.*, 1887, p. 194.) Leaves of this species yielded (*loc. cit.*, p. 270) 40.59 per cent. of extract, and 3.998 per cent. of tannic acid. Mueller and Rummel found 3.47 per cent. in leaves of this species.

South Australia, Victoria, Tasmania and New South Wales.

75. **Eucryphia Moorei,** *F.v.M.*, N.O., Saxifrageæ, B.Fl., ii., 447.

"Acacia" of the colonists, as when not in flower it resembles some of the larger species of that genus. "Plum" of Southern New South Wales. Called also "White Sally."

This bark has been tried by some settlers in the Braidwood district as a tan, "with excellent results." A specimen from this locality yielded the author 21.4 per cent. of extract, and 7.74 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 34.)

Victoria and New South Wales.

76. **Eugenia Smithii,** *Poir.*, (Syn. *E. elliptica*, Smith; *Myrtus Smithii*, Spreng.; *Acmena floribunda*, var. DC.; *Syzygium brachynemum*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 283.

"Lilly-pilly" is the common colonial name. "Tdjerail" and "Coochin-Coochin" are aboriginal names in use in New South Wales and Queensland respectively.

The bark contains 16.9 per cent. of tannic acid, and 3.6 per cent. of gallic acid. (Mueller.)

Victoria to Northern Australia.

77. **Exocarpus cupressiformis,** *Labill.*, (Syn. *Leptomeria acerba*, Sieb. non R.Br.); N.O., Santalaceæ, B.Fl., vi., 229.

"Native Cherry." (For other vernacular names, see "Timbers.")

The author has examined a specimen of bark from this species. The specimen was taken from a poor tree, yet it yielded 15.752 per cent. of tannic acid, and 29.99 per cent. of extract. (*Proc. R.S., N.S.W.*, 205.)

In all the colonies.

78. **Fusanus acuminatus,** (Syn. *Santalum acuminatum*, A. DC.; *S. Preissianum*, Miq.; *S. cognatum*, Miq.); N.O., Santalaceæ, B.Fl., vi., 215. (*S. acuminatum* in Muell., Cens., p. 64.)

"Quandong." (For other vernacular names, see "Timbers.")

Bark of this species obtained from near Hay, N.S.W., yielded the author 39.46 per cent. of extract, and 18.84 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, p. 94.)

In all the colonies except Tasmania.

79. **Grevillea striata,** *R.Br.*, (Syn. *G. lineata*, R.Br.); N.O., Proteaceæ, B.Fl., v., 462.

"Beefwood."

The author has obtained 22.02 per cent. of a dark-coloured extract, and 17.84 per cent. of tannic acid from a sample of this bark obtained from near the Darling River. (*Proc. R.S., N.S.W.*, 1887, 202.)

In all the colonies except Victoria and Tasmania.

80. **Hakea leucoptera,** *R.Br.*, N.O., Proteaceæ, B.Fl., v., 515.

"Needle," or "Pin Bush." "Water Tree." (For botanical synonyms, see "Timbers.")

The author has obtained 14.95 per cent. of extract, and 10.99 per cent. of tannic acid from a sample of bark of this species obtained from near Ivanhoe, New South Wales. (*Proc. R.S., N.S.W.*, 1887, 202.)

South Australia, Victoria, New South Wales and Queensland.

81. **Nesodaphne obtusifolia,** *Benth.*, (Syn. *Beilschmiedia obtusifolia*, Benth. et Hook.; *Cryptocarya obtusifolia*, F.v.M.); N.O., Laurineæ, B.Fl., v. 299. *Beilschmiedia obtusifolia* in Muell. Cens., p. 3.

"Sassafras."

The bark contains a tannin similar or identical with cinchona-tannin, to the extent of 7½ per cent. (Staiger.)

Northern New South Wales and Queensland.

82. **Pittosporum undulatum,** *Vent.*, N.O., Pittosporeæ, B.Fl. i., 111.

"Native Laurel." "Mock Orange."

The bark yielded 1.2 per cent. of tannic acid, and .7 per cent. of gallic acid (Mueller).

Tasmania, Victoria, New South Wales and Queensland.

83. **Polygonum plebejum,** *R.Br.*, N.O., Polygonaceæ, B.Fl., v. 267.

A species of *Polygonum* is used for tanning purposes in the United States. The author was, therefore, induced to examine this common Australian species of *Polygonum*. The whole plant, except the root, was taken, and 28.11 per cent. of extract obtained, and 11.19 per cent. of tannic acid. (*Proc. R.S., N.S.W.*, 1887, 200.)

In all the colonies except Western Australia and Tasmania.

84. **Rhizophora mucronata,** *Lam.*, (Syn. *R. Mangle*, Roxb.; *R. Candelaria*, Wight et Arn.); N.O., Rhizophoreæ, B.Fl., ii., 493.

"Mangrove."

The bark of this mangrove is used for tanning in India. The following is an analysis of the bark :—Tannin, 28.85 per cent.; extract, 29.24 per cent. (Staiger.)

New South Wales, Queensland and Northern Australia.

85. **Rhus rhodanthema,** *F.v.M.*, (Syn. *R. elegans*, Hill); N.O., Anacardiaceæ, B.Fl., i., 489.

"Deep Yellow-wood." (For other vernacular names, see "Timbers.")

The author has examined the leaves and bark of this tree. (*Proc. R.S., N.S.W.*, 1887.) The bark was found to contain no less than 23.15 per cent. of tannic acid, and 44.79 per cent. of extract to water. The leaves yielded 32.2 per cent. of extract, and 16.91 per cent. of tannic acid. This percentage is lower than that yielded by other species of *Rhus* producing the sumach of commerce, but as *R. rhodanthema* leaves will undoubtedly yield a light-coloured leather, they may yet come into commerce.

New South Wales and Queensland.

86. **Syncarpia Hillii,** *Bail.*, N.O., Myrtaceæ, *Proc. Royal Soc., Queensland*, i., 86.

"Turpentine Tree" and "Peebeen." (Frazer's Island, North Queensland.)

The bark contains 7.68 per cent. of tannin. (Staiger.)

Queensland.

87. **Tristania conferta,** *R.Br.*, (Syn., *T. subverticillata*, Wendl.; *T. macrophylla*, A. Cunn.; *Lophostemon arborescens*, Schott.; *L. macrophyllum*, R.Br.); N.O., Myrtaceæ, B.Fl., iii., 263.

"White Box." "Red Box." "Brush Box." "Bastard Box." "Brisbane Box." "Mahogany." "Tubbil-pulla" of some Queensland aborigines.

This bark is occasionally used for tanning.

New South Wales, Queensland and Northern Australia.

TIMBERS.

THE timbers of Australia are the most valuable of all the uncultivated vegetable products. The indigenous trees are numerous, both as regards species and individuals, but we must confess that our knowledge in regard to their timber lacks precision. To reconcile the different conflicting statements in regard to certain timbers will be the work of years, and can only be accomplished by the generous co-operation of people in all parts of the colonies. At least, as far as New South Wales is concerned, the author ventures to express the hope that dwellers in different parts of it may favour him with small specimens, sufficient in size for critical examination, of each timber in their neighbourhood, with samples of the bark, flower, and fruit, and attached to each parcel the local vernacular name. On most stations there is an intelligent employee to whom the task of getting together such specimens could be entrusted.

Mr. William Hogarth, of Momba, Wilcannia, has communicated to the author the following observation on the durability of timbers:—

"In any locality, wherever a particular kind of tree predominates, that timber will last longest in the ground—for instance, the Mulga where Mulga predominates, that is in dry situations, while in damp situations, where "Box" predominates, the Mulga soon rots, and Box lasts longer in the ground. Where Oak (*Casuarina*) predominates, Mulga and Box will rot sooner than Oak, and so on." Mr. Hogarth made these observations, having had many old fences to pull down on his run, and in putting up new ones he acts as much as possible keeping this in view. These conclusions have been combated by some gentlemen from Western New South Wales to whom the author broached the subject. The matter is, however, worthy of ventilation, and the author would much like to receive communications on the subject from various parts of the colonies.

SEASONING OF TIMBER.

It is hoped that the few notes which follow may be of service.

The method the author has adopted for seasoning logs of timbers for exhibition in the Technological Museum is as follows :—

The logs are stood on end, and the upper end, which is exposed to the atmosphere, is soaked with boiled linseed oil, and this is covered with white-lead of the consistency of cream one or two days after. The other end of the log stands on the floor, and is not sealed up in any way, as this would prevent the moisture draining away or evaporating. Two iron bands are made, of the same diameter as the log. The ends are free, are turned out at right angles, and holes are bored to receive a screw-bolt. By means of nuts, each band is tightened up as much as possible, having previously, by a few blows of the hammer, caused each band to follow the outline of the log. Every few days the bands are tightened up. The author has only adopted this method for eighteen months, so it would be premature to say too much about it, but up to the present he has no reason to suppose that it will not be effectual.

A similar plan seems to be adopted in the Mauritius, where ebony, when freshly cut, is beautifully sound, although it splits like all other woods by neglectful exposure to the sun. The workmen immerse it in water as soon as it is felled for six to eighteen months; it is then taken out, and the two ends are secured from splitting by iron rings and wedges.

This method is, of course, somewhat expensive and tedious, but even if it should be considered out of the question to thus treat the most valuable of our Eucalyptus timbers, many of our smaller ornamental timbers would well repay the moderate amount of trouble involved in treating them in this way.

As a matter of fact, the timbers in Australia rarely receive any seasoning or care whatsoever. Timber of a particular kind often appears in patches in a forest, and wherever convenient a sawpit is established in a position as central as possible. After a tree is felled, it is usually converted into sawn stuff with a minimum of delay. Seasoning is, as a rule, never thought of, though some go

so far as to partially season by storage in sawdust from the pit, while others sometimes adopt the water process.

The remarks of Mr. Shields (*infra*) are as true to-day as when spoken twenty-five years ago. It is, however, not likely that any immediate improvement will take place in the matter of seasoning, for the reason that Australian hardwood (which forms the great bulk of the timber) is cheap on account of its abundance, while the cost of labour is very great. Moreover, the difficulty of manipulating it, on account of its great weight, stands in the way of seasoning it on an extensive scale. It has not yet been brought home to our country sawyers that seasoning of timber will *pay*. And more attention should be paid than at present to cutting the timber *at the proper season, i.e.*, when the sap is least active, a time which (within certain limits) can only be determined locally in each case.

Mr. Shields stated, from his experience in the use of Australian woods, that it was the custom in that country to cut down the timber as it grew, to convert it into the required shape, and to use it without any kind of seasoning or preparation. It was not to be supposed that timber, under such conditions, would, when exposed to the burning sun of India, endure for any long period. He believed that when properly seasoned, as all timber required to be, by the use of some simple means of preparation, such as immersion in water, or exposure, under cover from the sun, to a current of air, Australian timber would be found as durable as that of any other country, and he knew of none in any part of the world which was equal to it in strength or tenacity. It approached inferior wrought iron in textile strength, and possessed excellent properties if it was subjected to fair treatment. He thought more might be done with Australian timber than had been the case hitherto, and he considered the use of it should not be abandoned without further trial. (*Proc. Inst. C.E.*, xxii., 258.)

The author has compiled the few notes on seasoning which follow, chiefly from *Notes on Building Construction*, Part iii. (Rivingtons), *The Materials of Engineering* (Thurston), *Sawmills, their Arrangement and Management* (M. Powis Bale).

Natural or air seasoning gives the best results. The timber should in all cases be squared as soon as cut, and all large logs

should be halved, or even quartered. It is then piled in the seasoning yard in such a manner as to be protected as far as possible from the sun and rain. It should be placed where the air may circulate freely on all sides, not only of the pile, but of each log; bad ventilation is sure to cause rot. (Thurston, *op. cit.*) If stacked in the open air it should be arranged at a considerable inclination. (Bale.) It should be sheltered, if possible, from high winds. Rankine states that natural seasoning to fit timber for carpenters' work usually occupies about two years; for joiners' work, about four years.

Hot air seasoning is resorted to where it becomes necessary to season wood rapidly. The timber is piled in large chambers or ovens. The sap is expelled by a current of hot air having a temperature of 121° to 149°* C for logs of hardwood.

Seasoning by passing the smoke-laden products of combustion from the furnace, directly through the pile of timber, has been found not only a good method of seasoning, but also to have an important and useful preservative effect. (Thurston, *op. cit.*) McNeile's process, consisting in exposing the wood to a moderate heat in a moist atmosphere charged with the various gases produced by the combustion of fuel, is a modification of this.

Different forms of apparatus for hot-air seasoning are either described or figured (or both) in most works on constructive materials. Rankine calls this the best method of artificial seasoning.

It is sometimes convenient to season timber by stacking it about the boiler of the engine used to drive machinery.

Desiccation is useful only for small scantling; the expense of applying it to large timber is very great; moreover, "as wood is one of the worst conductors of heat, if this plan be applied to large logs, the interior fibres still retain their original bulk, while those near the surface have a tendency to shrink, the consequence of which would be cracks and splits of more or less depth." (Tredgold.) Desiccated timber should not be exposed to damp before use. Mr. Laslett states that during this process ordinary woods lose their strength, and coloured woods become pale and wanting in lustre.

* The temperature varies with different authorities.

Water seasoning is accomplished by immerson in water for a long time. It is a slow and imperfect method, but for timber to be used in water or in damp situations, it answers well. The sap, in this case, is removed by solution. (Thurston, *op. cit.*) Timber thus seasoned is less liable to warp and crack, but is rendered brittle and unfit for purposes where strength and elasticity are required. Care must be taken that the timber is entirely submerged. Partial immersion, such as is usual in timber ponds, injures the log along the water-line. It must then be carefully dried, with free access of air, and turned daily. Timber that has been saturated should be thoroughly dried before use; when taken from a pond, cut up and used wet, dry rot soon sets in. Salt-water makes the wood harder, heavier, and more durable, but it should not be applied to timber for use in ordinary buildings, because it gives the wood a permanent tendency to attract moisture; also, if salt-water be used, great watchfulness must be exercised to prevent any damage to the timber by salt-water borers. Two or three weeks' water-seasoning is sometimes found to be a good preparation for air-seasoning, by dissolving out the more soluble salts contained in the wood. (Thurston.)

Steaming timber is a method of seasoning sometimes employed. It, however, impairs the strength, but it preserves from decay (as it is considered by some to prevent dry rot), as well as from injury by warping or cracking.

Boiling timber in water has much the same effect as steaming, but objections to both processes are their cost, and their weakening effect on the timber.

Seasoning by boiling in oil is resorted to for some purposes, as in making teeth in mortice gears. The temperature should be kept at, or somewhat under 121° C. The wood should be seasoned in blocks roughed out to near the finishing size, and they become not only well and uniformly seasoned, but, as shown by the experiments of Mr. G. H. Corliss, considerably strengthened. (Thurston, *op. cit.*)

It is especially necessary that timber used for wheelwright purposes should be thoroughly well seasoned, as it will be found that often, after very little use, the spokes will shake in their places,

and the wheel almost fall to pieces. To obviate this, many good makers block out the wheels roughly, and let them season for a time before finishing. In any case it is highly important that the parts of the wheel should not be put together before the wood has entirely ceased to shrink. This remark applies equally well to agricultural implements, furniture, &c. (Bale.) Some authorities recommend the boring of a hole through the centre of a log to facilitate seasoning, and the author knows wheelwrights in New South Wales who regularly practice it with Eucalyptus timbers, though to what extent the method is adopted he cannot say.

Mr. T. Laslett objects to ringbarking Teak with the view to seasoning it, and inasmuch as the practice of ringbarking is all but universal in Australia, whether to bring the land under cultivation or pasture, or to utilize the timber, it will be well to consider his observations on the effect of the practice as regards the quality of the timber.

"It is the practice in Burmah to girdle the Teak trees three years before they intend to fell them. . . . . The natural juices contained in a tree being gradually run off by the root while it stands. This, and the great heat of the climate combined, seasons the wood, and renders the log—which in its green state would have a specific gravity of at least 1.000, and be difficult to move if felled—so much lighter that it flows easily over the shallows of the streams or rivers to the port of shipment. . . . The practice of girdling is, I think, objectionable, inasmuch as the timber dries too rapidly, is liable to become brittle and inelastic, and leads frequently to the loss of many fine trees by breakage in falling; further, it must be regarded as so much time taken from the limit of its duration, which is of great importance. Girdling has been discontinued in the Annamallay forests of Malabar, under the impression that it causes, or at least extends, the heart-shake." (*Timber and Timber Trees*, p. 115.)

The best method of seasoning timber in Australia is still, however, unsettled. With the object of ascertaining the best method of treating timbers with the view to seasoning, the Victorian Carriage Board recommends that "a number of trees of each several kind might be rung and left standing in the forest, a

similar number being felled, both after a lapse of time being opened and compared. If the standing timber compared favourably with that felled, the former method might be recommended for adoption, more particularly to settlers in agricultural districts, where the standing timber would offer but a small obstruction to farming operations, and might be removed at convenience."

In regard to the soft brush timbers, it is the experience of bushmen that, if they are seasoned in the log they go bad; in order to season properly they should be split or cut open soon after falling. But, of course, there is a difference between seasoning in the log under cover, and allowing the logs to be exposed to the weather.

EXPERIMENTS ON THE STRENGTH OF AUSTRALIAN TIMBERS.

Experiments on Australian timbers (chiefly hardwoods) have occupied different workers for many years, but they vary so much in their results, and have been performed under such diverse circumstances, that it is impossible to condense them into one general statement. In regard to those experiments, the results of which are more or less difficult of access to the majority of people, the author has given brief statements of the conditions under which they were performed, and this, taken in conjunction with the plan which he has invariably adopted, of giving all information known to him in regard to each timber under the name of that timber, will render comparison of the experiments as easy as possible.

In this connection he would invite attention to a paper, entitled "The Want of a Uniform System in Experimenting upon Timber," by F. A. Campbell, C.E., *Proc. Royal Soc. of Victoria*, 9th December, 1886. Mr. Campbell summarises as follows the circumstances which affect the results in timber tests :—

1. Age of tree.
2. Nature of locality where grown.
3. Part of tree from which timber is taken.
4. Length of time seasoned.
5. Deflection as affecting the bending moment of a beam.
6. Size of piece tested.

Some of these points will be dwelt upon below, and the author will now content himself by adding that one of the greatest difficulties in the utilization of results is the doubt which exists as to the identity of the timbers experimented upon by different observers. A wood may be stated to be "Ironbark" or "Blue Gum," and it may be one of some half a dozen timbers. In regard to Eucalyptus timbers in particular, the author can say (as one through whose hands many hundreds of specimens of such timbers have passed, and who has some little knowledge of Australian timber trees) that the origin of those used in many experiments is open to doubt,* and that in regard to many species the work of testing the timber, having previously placed its identity beyond all doubt, by means of a complete series of botanical specimens obtained from the same, or an adjacent tree, remains to be done.

Following are references to published experiments on the strength of Australian timber :—

1851. "On the strength, durability, and value of the timber of the Blue Gum† of Tasmania, and of some other Eucalypts ‡ for ship-building." With tables, by James Mitchell. (*Papers* and *Procs., Royal Society of Van Diemen's Land*, Vol. ii., Part i., 1852. 12th Nov., 1851.)

"The apparatus used for testing the transverse strength consists of two strong pieces of frame-work, seven feet asunder, attached to the sides of a small building. The deflection was measured upon a scale attached to the wood by a silk thread stretched over the frame-work by plummets, in the same manner as described by Professor Barlow. The weights (56lbs. and under) were placed upon a scale hung upon the middle of the wood by means of a half-inch iron-eye, two and a half inches square.

"The weights were then placed upon the scale until the deflection amounted to half an inch, when they were removed, and the wood was permitted to resume its original straight form;

* With the reservations made when speaking of some individual specimens of timber, the origin of the timbers experimented upon in the instances selected by the author is open to no doubt.

† *E. globulus.*

‡ *E. viminalis* and *E. obliqua.*

the weights were then replaced, and removed at each succeeding eighth of an inch of deflection, until the wood was observed to lose, however slightly, the power to recover its rectilineal form; a failure in this respect, amounting to the diameter of the thread, was sufficient to determine its character for elasticity, after which the weights were continued until the fracture took place.

"The apparatus used for ascertaining the direct cohesion was as follows: Lengths of about 16 inches were cut from the pieces broken transversely, and turned in an ordinary lathe to about one and a half inches diameter; about an inch in the middle was further turned down to three-eights of an inch diameter, which was then carefully squared to a quarter of an inch with a fine file; and this, in each case, formed the portion to be tested. Through a hole accurately bored across the thick part of these pieces, near each end, short bolts were passed; to these bolts were attached short pieces of good rope, having eyes spliced in each end to receive them. A second piece of rope, passed through the first in the form of a link, sustained the scale at the lower end; and a similar one at the upper end hooked the beam which held the whole."

1855. Tests of New South Wales timbers at the Paris Exhibition, by Captain Fowke, R.E. (The author has been unable to obtain access to a record of these tests.) Some of the results are reproduced in Mr. Balfour's Report (*infra*).

The experiments were all made on samples two inches square and one foot between supports, any which did not agree with those standard dimensions being reduced thereto by calculation.

1858. "Report of Results obtained from Experiments on the Elasticity and Strength of Timber in New South Wales, procured through the Chief Commissioner of Railways, and tested at the Sydney Branch of the Royal Mint, in the month of March, 1858." Read before the *Philosophical Society of New South Wales* (now the Royal Society), 12th May, 1858, and printed in *The Sydney Magazine of Science and Art* for May, 1858 (p. 258).

"The specimens used were fresh cut, taken from trees in the neighbourhood of Belford, which lies eighteen miles from Maitland and ten miles from Singleton, on the Great Northern road.

The experiments were conducted as follows:—"The distance between the supports was four feet; the beam rested on iron trestle-heads, firmly fixed and prevented from collapsing by stays, the ends left free, the weights were applied in the centre, and increased by half-hundred weights at a time, at the intervals of half-an-hour, till the elasticity was evidently destroyed, when the interval between each addition was prolonged to an hour. At the end of each interval the beam was relieved of its weight. This was effected by means of a screw-jack, which raised the scale on which the weights rested, thus the beam was always relieved from pressure, and subjected to it, without jerks."

1860. "Report of further experiments conducted at the Sydney Branch of the Royal Mint, to determine the strength and elasticity of colonial timber, by E. W. Ward, Esq., Deputy-Master, presented to Parliament 6th February, 1861." *New South Wales Votes and Proceedings* for 1861, vol. ii. (In the following pages this report is referred to when the words "Sydney Mint" are used.)

The experiments were conducted as follows:—"The timber, which usually consisted of a beam 2" x 2" in scantling, and five feet in length, was placed horizontally on supports four feet apart, and consisting of iron trestle-heads firmly fixed, and secured from collapsing by stays. The ends of the beam were left free. The weights were applied to the centre by means of a scale suspended from an iron staple adjusted half way between the supports. Commencing with a weight of six cwt., an addition of half a cwt. was made at the end of every half-hour until nine cwt. had been applied, when the interval between each successive application was extended to one hour. At the end of each interval the beam was relieved of its weight by means of a screw-jack, which raised the scale in which the weights rested, and after the addition of half a cwt. the weight was brought to bear by gently lowering the scale, by the means which it had been raised. As soon as it was noticed that the beam on being relieved did not return to its horizontal position, the weight in the scale, and the deflection of the beam at that weight (the deflection at any particular weight

was indicated on a dial fixed above the beam, and having a point connected by a simple arrangement with the iron staple to which the scale was attached), were recorded as those at which the elasticity had become impaired, and used as the necessary factors for determining the value of E. After this, successive additions were made of half a cwt. at the intervals and in the manner already mentioned, until the beam broke; the breaking weight, or that less by half a cwt., if the beam broke within one minute of the weight being applied, being taken to determine the value of the constant S.

"The screw-jack employed was found convenient for many purposes. Being fitted on the top with a horizontal table, it served to raise and lower the scale containing the weights, and thus to apply to the beam the desired pressure without jerk; it admitted of such an adjustment of the table as to prevent (on the fracture of the beam) the fall of the scale through unnecessary space, and the damage to the scale often so occasioned; and it allowed the scale to be attached to a fresh beam without removing the whole of the weights."

1865. "Results of a series of experiments on the strength of New Zealand and other colonial woods, by J. M. Balfour, C.E., Provincial Marine Engineer of Otago, etc." Forming Appendix C of the *Report of the New Zealand Exhibition of* 1864.

The experiments were conducted in the following manner:—"A pressure of 50lbs. was applied for two minutes (as measured by a sand-glass), and the sample was then released; 75lbs. were then applied for the same time; then a 100lbs., and so on, increasing by 25lbs. each time. Each time the sample was released the point on the deflection scale to which it returned was read, and when it came to be notably under the original reading, the specimen was allowed to remain unloaded for two minutes, to see whether it would in time further recover itself. When, however, there were indications that the point of fracture was nearly attained, the pressure was gradually and steadily increased, without being again removed, until the specimen broke, the observer keeping his eye on the deflection scale and noting its reading at the first crack, the maximum pressure exerted being indicated on

the proper scale, by a simple self-registering arrangement. After a certain number of specimens of the wood being examined had been treated in this way, the remainder, if any, were broken more rapidly by a gradually increasing steady pressure which was never relaxed. These experiments were specially noted in a 'remarks' column. This system was used throughout, except that, when the first experiment showed that the wood was very weak, the first weight applied was 20lbs. only, and the regular increment varied from 10lbs. to 20lbs., according to the circumstances of the case.

"The period during which each pressure was applied was certainly rather short to allow the weight to have its full effect, but it was adopted as a necessary compromise between the work to be overtaken and the time in which it required to be done. The rapidity with which the experiments were carried on may have had the effect of making the results somewhat high, but as the values of E should be equally influenced with those of S, and as the values of E are not inconsistent with those ascertained at Sydney, (*Further Experiments*, &c., by Capt. Ward, R.E.), there is no evidence to show that such has been the case.

. . . "In Barlow's work E is calculated for a unit of one inch long and one inch square. In calculating these results the unit has been assumed as one foot long, so that Barlow's E has to be divided by 12^3 or 1,728, and *vice versa*, to get the corresponding quantities. . . . Column S is the most important of all, as giving the ultimate strength of the timber. The values extracted from Barlow's work and elsewhere have been divided by twelve, to reduce the results to a uniform standard of one foot long, which is considered more convenient than the old unit of one inch."

1875. *Timber and Timber Trees, Native and Foreign*, by Thomas Laslett, Timber Inspector to the Admiralty. London, Macmillan & Co.

"The tests for the transverse strengths in my experiments were conducted, in every case, with pieces $2'' \times 2'' \times 84'' = 336$ cubic inches. Each piece was placed upon supports exactly six feet apart, and then water was placed gently and gradually into

a scale suspended from the middle until the piece broke, note being taken of the deflection with 390lbs. weight, and also at the crisis of breaking.

"After this, a piece two feet six inches in length was taken, whenever it was found practicable, from one of the two pieces broken by the transverse strain, and tested for the tensile strain by means of a powerful hydraulic machine, the direct cohesion of the fibres being thus obtained with great exactness. Further, for the purpose of determining the proportions of size to length best adapted for supporting heavy weights, a great many cube blocks were prepared, of various sizes, as also a number of other pieces of different form and dimensions, which were then, by the aid of the same machine, subjected to gradually increasing vertical pressure in the direction of their fibres, until a force sufficient to crush them was obtained."

1879. F. Byerley, C.E., in *The Australian Engineering and Building News*, November, 1879.

He experimented (see *Eucalyptographia*, under *E. tesselaris*) on seasoned specimens of one inch square, weights being applied to the middle of the rods between supports one foot apart, the ends being free.

1879. "Experiments on the Tensile Strength of a few of the Colonial Timbers," by Fred. A. Campbell, C.E., *Trans. Royal Soc. of Victoria*, 1879.

"As the power I could bring to bear on the specimens did not exceed one ton, I found it necessary to work upon specimens with a sectional area of one-sixteenth of an inch. . . . The apparatus used was of the roughest description, but it answered its purpose. The specimens were held at each end by wrought iron clips (figures are given with the paper), and then hung and pulled by means of a lever. Using known weights, and sliding them along the lever, which was graduated, I readily obtained the breaking weight of the specimen. The weights were always applied in such a way as to cause a gradually increasing stress upon the specimen, perhaps fifteen to twenty minutes being taken to work up to the breaking weight."

1880. "Results of experiments on the transverse strength of the wood of *E. globulus*," by Baron von Mueller and J. G. Luehmann.

"Results of experiments on the transverse strength of the wood of various Eucalypts," by the same.

Both these tables are published in a *Catalogue of Timbers of Victoria in the Technological Museum of Melbourne*, by Baron Mueller. They were originally published in the Sixth Decade of the learned Baron's *Eucalyptographia* under *E. globulus*.

The experiments were performed on pieces of two inches square, and two feet long between the supports, the weight suspended in the middle, both ends free. The *E. globulus* timber was seasoned for nine months; similar information is not given in regard to the other timbers.

1884. "Official Report of the Carriage Timber Board, Victorian Railways, Melbourne, 1884." This Board was appointed, on a motion in the Victorian Parliament, with the view of ascertaining, by various experiments, the best kind of timber grown in the Australian colonies adapted for the construction of railway vehicles.

The timbers received were seasoned for a year, and tests of them were conducted at the railway workshops at Newport, near Melbourne, from January to April, 1884. The mode of testing the various specimens was as follows:—

"Two standards, six feet apart, were erected to form bearings for the specimens, which were seven feet long, and one seven-eighth of an inch square. Weight was applied at the centre, where a measure was adjusted to show, in inches and parts, the exact deflection at, and before breakage. Three specimens of each contribution were tested, and the mean result recorded."

1886. "The strength and elasticity of Ironbark timber as applied to works of construction," by Prof. Warren. (See *Proc. R.S., N.S.W.*, 1886.) In this paper Prof. Warren (besides the experiments performed by himself) alludes to two experiments on the transverse strength of beams of Ironbark not referred to above.

1887. "The strength and elasticity of New South Wales timbers of commercial value," by Prof. W. H. Warren, M.I.C.E.

(Government Printer, Sydney). The paper is illustrated by numerous plates showing the apparatus employed, and also showing graphically the stresses to which the timbers were subjected. An autographic stress-strain apparatus (designed by Prof. Warren and Mr. J. A. McDonald) was used.

ENEMIES OF COLONIAL TIMBER *(Xylophages or Wood-eaters).*

The following animals are referred to in the section "Timbers" as being injurious to wood; it may, therefore, be interesting to have a few notes about them:—

Chelura terebrans, a small Amphipodous Crustacean which bores in wood-work immersed in sea-water. (For figure, see *Treasury of Natural History*, p. 123.)

Cobra is the vernacular name given to certain molluscs, *Calobates sp.*, etc., very destructive to wood immersed in sea-water.

In the *Trans. Linn. Soc.* vol. xxv., 564, is a paper by Professor Percival Wright, on the *Teredidæ*. In that paper he describes and figures two new species, *Calobates australis*, destructive to timber at Fremantle, Western Australia, and *Nausitoria Saulii*, similarly destructive in Port Philip, Victoria.

Teredo, or "Ship-worm," is the name given to a genus of testaceous molluscs, which form their habitations by boring holes in submerged timber, and thereby occasion destructive ravages in ships' bottoms, sunken piles, etc. The *Teredo navalis* is worm-shaped, and about six inches long. (See figure in *Cassell's Natural History.*) In making its excavations into the wood, which it does by boring into the substance in the direction of the grain, each individual is careful to avoid the tube made by its neighbour, and often a very thin leaf of wood alone is left between; it also, when a knot occurs in its path, makes a turn to avoid it. (*Treasury of Natural History.*)

However, "but for the maligned *Teredo*, the sea would be so covered with floating logs as to be to some extent unnavigable; the rivers of warm latitudes would be choked up by the accumulated drift-wood at their mouths, and their fertile banks would, in many cases, be converted into morasses." (Dr. Ball, quoted by Patterson.)

There is a paper in the *Proc. R.S., Van Diemen's Land*, 1852, by Sir W. T. Denison, on "The Operation of *Teredo navalis* in colonial timber." He states: "The absolute amount of the action of the worm in the Harbour of Hobart Town from these observations would appear to be equivalent to a reduction of one and a half inches in the diameter of a round pile in eight years, or at the rate of about one-fifth of an inch per annum." Two species of Eucalyptus are referred to, but their botanical names are not given. One is probably *E. globulus*, and the other *E. amygdalina*. For a return showing the approximate injury done by the *Teredo* and other sea-worms, to submerged timbers within the waters of Victoria, see *Report on Indigenous Vegetable Substances, Victorian Exhibition*, 1861.

Termites, or *White Ants*. "Next to locusts, they may be reckoned the most destructive insects known to man. They live in societies, often prodigiously numerous, and, like the bee and ant, are composed of three sorts of individuals. In all the stages of their existence, save that of the ovum, they are active, carnivorous or omnivorous; and are, beyond all doubt, the greatest pest of tropical climates; destroying all articles of furniture made of wood, clothes, &c., and even entering the foundations of houses, and eating out the whole interior of the timbers, so that while they appear perfectly sound externally, they will fall to pieces under the slightest blow. . . . The Termites generally make their approaches to the nest under ground, descending below the foundations of houses and stores at several feet from the surface, and rising again either in the floors or entering at the bottoms of the posts of which the sides of the buildings are composed, following the course of the fibres to the top, and having lateral perforations or cavities here and there. While some of them are employed in gutting the posts, others ascend from them, entering a rafter or some other part of the roof in search, as would seem, of thatch, which appears to be their favourite food; and if they find it, they bring up wet clay, and build galleries through the roof in various directions, as long as it will support them. In this manner a wooden house is speedily destroyed; and all that it contains is, at the same time, subjected to the ravages of these destructive insects.

"In carrying on this business they sometimes find, by some means or other, that the post has a certain weight to support, and then, if it is a convenient track to the roof, or is itself a kind of wood agreeable to them, they bring their mortar; and, as fast as they take away the wood, replace the vacancy with that material, which they work together more closely and compactly than human strength or art could ram it. Hence, when the house is taken to pieces, in order to examine if any of the posts are fit to be used again, those made of the softer kinds of wood are often found reduced almost to a shell; and almost all of them are found transformed from wood to clay, as solid and as hard as many kinds of stone that are used for the purposes of building." (*Treasury of Natural History.*) The above is taken from an account of *Termes bellicosus*, but the description more or less applies to other species. For an account of the life-history of *Termes* see the book above quoted, also *Cassell's Natural History*, vi., 137, which is adorned with some splendid illustrations of this genus. See also appendix to Carpenter's *Zoology*.

The Wattle Goat-Moth. *Zeuzera (Eudoxyla) Eucalypti* (Boisd. Herr. Schæf.)

The following notes respecting this insect are entirely taken from Professor McCoy's *Prodromus of the Zoology of Victoria*, Decade iii., where (Plate 30) a coloured plate illustrating its life-history is given.

Considering the great importance attached by the Government to the preservation and cultivation of wattle trees (*Acacia*), it is important for bark-strippers and others interested in the industry, to know the appearance of the insect represented on the plate (above alluded to) as the greatest destroyer of these trees, so that attention may be given to destroying the perfect moth; the large abdomen of the female of which is distended with millions of eggs, each of which will produce a voracious grub as thick as one's thumb, and five or six inches long, eating the timber for years.

It is unfortunate that the specific name *Eucalypti* should have been given to this species, as it never frequents any *Eucalyptus*, but feeds exclusively on the wood of *Acacias*.

The lava, hatched from eggs laid in crevices of the bark of the branches, works steadily into the interior of the tree, proceeding head downwards, enlarging the cylindrical burrows as it gradually grows larger and eats its way downwards, often reaching to the roots. When about to assume the pupa state it forms a slight cylindrical cocoon from four inches to a foot long, of silk and sawdust-like small grains of wood, as a lining to the end of its burrow. When the burrow terminates in a root a few inches below the surface of the ground, the cocoon is continued from the hole in the wood upwards as far as close to the surface of the ground; but when the burrow ends in the surface of the trunk of the tree above the ground level there is no prolongation of the cocoon. In either case the pupa works itself forward by means of the little deflected spines on the rings, pushing for half-an-inch or so through the end of the cocoon before it bursts to allow the imago to escape.

The ovipositor of the females is of extraordinary length and rigidity, equalling half the length of the abdomen when exserted, but capable of being entirely retracted out of sight; with this the eggs are deposited deep in the crevices or fissures of the bark of the trees, on the inner timber of which the larva feeds.

It is common in the winged state about February, flying in the twilight, in all parts where wattle trees abound.

In most forest-bearing countries the natural enemies of the larvæ, and protectors of the trees, are woodpeckers, who by instinct know where the larvæ are, and by powerful strokes of their bills cut down quickly on them through the sound wood, and transfixing the grubs with their long worm-like, barbed tongue, draw them out, and devour them. In Australia there are no woodpeckers, and the consequence is that every tree cut up for firewood is seen to be traversed with large cylindrical canals made by these or allied larvæ, which are the greatest destroyers of our forests, so abounding in the wood of almost every forest tree that, in a storm, it is dangerous to go near a large tree, as one apparently sound may snap across unexpectedly with a moderate wind.

Note.—The *heights* and *diameters* given of trees (below referred to) must only be received as approximations. The diameters are those of the stems about three feet from the ground.

1. **Acacia acuminata,** *Benth.*, (Syn. *A. Oldfieldii*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 404.

A "Myall." The ordinary name for species of the genus *Acacia* in the colonies is "Wattle." The name is an old English one, and signifies the interlacing of boughs together to form a kind of wicker-work. The aboriginals used them in the construction of their abodes, and the early colonists used to split the stems of slender species into laths for "wattling" the walls of their rude habitations.

The scent of the wood is comparable to that of raspberries. It is the best of West Australian woods for charcoal. The stems are much sought after for fence-posts, being very lasting, even when young. (Mueller.) The wood is also used by the aboriginals for making various weapons. It is a dark reddish-brown, close grained, hardwood, and Mr. Allen Ransome, who reported on the timbers sent to the Colonial and Indian Exhibition, expressed the opinion that it should find a ready sale in England for ornamental wood work. Height, 30 to 40 feet.

Western Australia.

2. **Acacia aneura,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 402.

The chief ingredient of "Mulga" scrub. ("Mulga" is the name of a long narrow shield of wood, made by the aboriginals out of Acacia wood.) A "Myall."

Wood excessively hard, dark brown, used by the aboriginals for boomerangs, sticks to lift edible roots, shafts of spears, nulla-nullas, and jagged spear-ends. (Mueller.) It makes excellent fencing posts, and in parts of Western New South Wales it is exceedingly plentiful and much appreciated. It is often used for bullock-yokes. Diameter, 9 to 12 inches; height, 20 to 30 feet.

Western Australia, through the other mainland colonies to Queensland.

3. **Acacia armata,** *R.Br.*, (Syn. *A. furcifera*, Lindl.); N.O., Leguminosæ, B.Fl., ii., 347.

"Kangaroo Thorn."

Much grown for hedges, though less manageable than various other hedge plants. Important for covering coast-sand with an unapproachable prickly vegetation. (Mueller.) The wood is

small, but beautifully grained, sound, and durable. Height, 10 to 20 feet.

Western Australia, through the mainland colonies to Queensland.

4. **Acacia aulacocarpa,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 410.

"Hickory Wattle."

Wood hard, heavy, tough, and dark-red; useful for cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1866.)

Queensland.

5. **Acacia Bidwilli,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 420.

"Waneu" of the aboriginals of Central Queensland. "Yadthor" of the aboriginals of the Cloncurry River, North Queensland.

Timber hard, close-grained, and takes a good polish. It has a light yellow sap-wood, while the heart-wood is dark. Diameter, 10 to 16 inches. Height, 20 to 30 feet.

Queensland and Northern Australia.

6. **Acacia binervata,** *DC.*, (Syn. *A. umbrosa*, A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 390.

"Black Wattle" of Illawarra (New South Wales), and further south. "Hickory." "Myimbarr" of the aboriginals of Illawarra. "Meroan-gange" of the aboriginals of the Counties of Cumberland and Camden (New South Wales). "Malla-waundie" of the aboriginals of Northern New South Wales.

This wood is close-grained, tough and light, and much prized for axe-helves and bullock yokes. As regards colour, it varies between a dirty white and pinkish, and a uniform dirty colour, similar, but more intense, than California Red Pine. The specimens seen by the author have no figure. Three slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862, under the names *A. binervata*, *A. umbrosa*, and *Pithecolobium umbrosum*), have weights which correspond to 50lb. 8oz., 51lb. 4oz., and 56lb. 11oz. respectively per cubic foot. Height, up to 30 or 40 feet, and 8 to 12 inches in diameter.

New South Wales and Queensland.

7. **Acacia brachybotrya,** *Benth.*, (Syn. *A. dictyocarpa*, Benth.); N.O., Leguminosæ, B.Fl., ii., 374.

Specific gravity of the wood 1.021. (*Report Victorian Exhibition*, 1861.)

South Australia, Victoria and New South Wales.

8, **Acacia calyculata,** *A. Cunn.;* N.O., Leguminosæ, B.Fl., ii., 410.

Wood dark brown, hard, heavy, and close-grained; suitable for turnery and cabinet work. (*Cat., Queensland Woods, Col. and Ind. Exb.*, 1886.)

Queensland.

9. **Acacia crassicarpa,** *A. Cunn.;* N.O., Leguminosæ, B.Fl., ii. 410.

Wood prettily marked, hard, and dark coloured. Height, 30 to 40 feet.

Queensland and Northern Australia.

10. **Acacia Cunninghami,** *Hooker*, N.O., Leguminosæ, B.Fl., ii., 407.

"Bastard Myall" of Northern New South Wales. "Kowarkul" of some Queensland aborigines.

Wood close-grained, and takes a good polish. It is dark-coloured and heavy, and a useful wood for cabinet purposes. It reminds one very much of Red Cedar, but it is rather heavier. It is very homogeneous. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London Exhibition of 1862), has a weight which corresponds to 46lbs. 12ozs. per cubic foot. Diameter, 9 to 12 inches; height, 20 to 30 feet.

Central New South Wales to Central Queensland.

. *decurrens* var.

11. **Acacia dealbata,** *Link*, (Syn. *A. irrorat*.terloo, Victoria. Leguminosæ, B.Fl., ii., 415. ..., 1883; dimen-

"Silver Wattle" (owing to the whiteness of the January 28th, 1874. hue of its young foliage).

Weight of samples, 9lbs., 8¼lbs., 8½lbs.; average weight of samples, 8.58lbs.; average weight per cubic foot, 50.20lbs.; average specific gravity, 0.804; total average specific gravity, 0.804; breaking weight of each sample, 6 tons 1 cwt. 9lbs., 6 tons 1 cwt. 4lbs., and 7 tons, 2 cwt. 3lbs.; average breaking weight of samples, 752.3lbs.; total average breaking weight, 752.3lbs.; deflection at point of rupture, 6½in., 5⅝in., and 3¾in.; average deflection, 5.29in.; total average deflection, 5.29in.; average specific strength, 2053. Geological formation where the trees grew, mesozoic; elevation above sea-level, about 1,200ft.

Tasmania, Victoria and New South Wales.

14. **Acacia doratoxylon,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 403.

"Spear-wood" (it being used by the aboriginals of the interior districts for that purpose). "Hickory;" a "Brigalow;" and "Caariwan;" or "Currawang" of the aboriginals, which latter name has come to be *frequently used by the colonists.*

Wood hard, and close-grained, tough, heavy, and durable; used for gates, buggy-poles, furniture, etc., and by the aboriginals for boomerangs and spears. It is dark-brown, with a small yellow sap-wood. Mr. G. S. Home tells me that this is one of the most useful timber trees in the Lachlan district of New South Wales. Specific gravity 1.215. (*Report, Victorian Exhibition,* 1861.) Diameter, 6 to 12in.; height, 20 to 35ft.

New South Wales, Queensland, Northern Australia, South Australia and Victoria.

15. **Acacia excelsa,** *Benth.*, (Syn. *A. Daintreana*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 390.

"Ironwood." Sometimes (though erroneously) called "Brigalow." Called "Bunkerman" by the aboriginals of the Cloncurry River, North Queensland.

The wood is hard, close-grained, and very tough and elastic. It possesses great beauty for cabinet-work, and has the odour of violets. (Hill.) Diameter, 24 to 36in ; height, 70 to 80ft.

Queensland.

16. **Acacia falcata,** *Willd.*, (Syn., *A. plagiophylla*, Spreng.; *Mimosa obliqua*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 361.

Called variously "Hickory," "Lignum Vitae," and "Sally," or "Sallee." It is the "Bastard Myall" of the Braidwood district (New South Wales). The "Wee-tjellan" of the aboriginals of Cumberland and Camden (New South Wales).

Wood hard, and much prized for stock-whip handles. An excellent tree for raising a woody vegetation on drift sand. (Mueller.) Near the outside of the log it is yellow, the rest is light brown. It is heavy and tough. It is bent into *acute* curves for coach-building purposes, the wood of *A. melanoxylon* being used for curves of greater radius. Diameter, 6 to 12in.; height, 20 to 30ft.

New South Wales and Southern Queensland.

17. **Acacia farnesiana,** *Willd.*, (Syn. *A. lenticillata*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 419.

Sometimes called by the absurd name of "Dead Finish." This name given to some species of *Acacia* and *Albizzia*, is on account of the trees or shrubs shooting thickly from the bottom, and forming an impenetrable barrier to the traveller, who is thus brought to a "dead finish" (stop).

This species is common in the tropics of both worlds. Wood close, heavy, and tough, taking a good polish. It is much used in India for ship-knees, tent-pegs, and similar purposes. Gamble (*Manual of Indian Timbers*) gives its weight as 49lbs. per cubic foot. Diameter, 3 to 6in.; height, 12 to 18ft.

The interior of South Australia and New South Wales, Queensland, Northern and Western Australia.

18. **Acacia fasciculifera,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 361.

Timber very hard, heavy, tough, and close-grained, yet easily worked. It is of a reddish colour. Diameter, 6 to 15in.; height, 20 to 30ft.

New South Wales and Queensland.

19. **Acacia flavescens,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 391.

Wood of a brown colour, prettily marked, close-grained, and hard.

Queensland.

20. **Acacia glaucescens,** *Willd.*, (Syn. *A. homomalla*, Wendl.; *A. cinerascens*, Sieb.; *A. leucadendron*, A. Cunn.; *Mimosa binervis*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 406.

Called variously "Brigalow," "Mountain Brigalow," "Rosewood," and "Myall." It is the "Kaarrewan" (see "Caariwan," *A. doratoxylon*) of the aboriginals of Camden and Cumberland (New South Wales), and the "Motherumba" (see also *A. salicina*) of the Castlereagh River (New South Wales) aboriginals.

Wood close-grained and prettily marked, scented, though less so than some other species of Acacia. It is very suitable for cabinet-making and turnery. It is used for spring-bars, tool handles, spears, &c. It has been likened to English walnut and rosewood. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), under the name of *A. homomalla*, has a weight which corresponds to 54lbs. 4oz. per cubic foot. Diameter, 12 to 18in.; height, 30 to 45ft.

Victoria, New South Wales and Queensland.

21. **Acacia Gnidium,** *Benth.*, N O., Leguminosæ, B.Fl., ii., 359.

Wood close-grained, hard, blackish, and takes a good polish. Diameter, 6 to 12in.; height, 12 to 20ft.

Queensland.

22. **Acacia harpophylla,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 389.

The common "Brigalow," so called because it forms "Brigalow scrubs." The word was spelt "Brigaloe" by Gould, and "Bricklow" by Leichhardt. The latter stated he could not ascertain the meaning of the name. "Orkor" of some aboriginals.

Wood brown, hard, heavy, and elastic; used by the natives · spears, boomerangs, and clubs. The wood splits freely, and

is used for fancy turnery. Saplings used as stakes in vineyards have lasted twenty years or more. It is used for building purposes, and has a strong odour of violets.

South Queensland.

23. **Acacia homalophylla,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 383.

A "Spear-wood." Called "Myall" in Victoria. "Curly Yarran" and "Narrow-leaved Yarran" are New South Wales names. Aboriginal names are as follows:—"Gidya," "Gidia," or "Gidgee" (with other spellings) in New South Wales and Queensland. This is the commonest colonial name. "Wong-arrah," Cloncurry River, Northern Queensland.

This dark-brown wood is much sought after for turners' work on account of its solidity and fragrance; perhaps its most extensive use is in the manufacture of tobacco-pipes. (Mueller.) It is well adapted for cabinet-making purposes, and fancy articles, such as rulers and napkin rings, are often made from it. The natives of New South Wales formerly employed it for spears. (A. Cunn.) Specific gravity, 1.124. *(Report, Victorian Exhibition,* 1861.) In Western New South Wales the wood is considered very durable, and is, therefore, used for the lining of wells, but then it is said to give the water a bad taste for several years. The smell of the tree when in flower is abominable, and just before rain almost unbearable, and on this sign people frequently foretell the approach of rain. I have heard of instances in which men who were employed in cutting down a tree of this species just before rain became so sick as to be compelled to leave the tree.

Interior of South Australia and New South Wales; Northern Victoria.

24. **Acacia implexa,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 389.

Wood hard, and close-grained, dark brown, with yellowish stripes; much in demand for turnery, cog-wheels, and other purposes which need tenacity and strength. (Dickinson.) The wood is very similar to that of *A. melanoxylon.* Specific gravity .711, *i.e.*, weight 44lbs. per cubic foot of dry wood. (Mueller.) Diameter, 12 to 16in.; height, 30 to 40ft.

Victoria, New South Wales and Queensland.

25. **Acacia juniperina,** *Willd.*, (Syn. *A. verticillata*, Sieb.; *A. echinula*, DC.; *A. pungens*, Spreng.; *Mimosa juniperina*, Vent.; *M. ulicina*, Wendl; *M. ulicifolia*, Salisb.); N.O., Leguminosæ, B.Fl., ii., 332.

The common "Prickly Wattle."

The wood is light, white, and tough, and much esteemed by splitters for maul handles. (Guilfoyle.) It is never more than a shrub. Height, 8 to 12ft.

Victoria, Tasmania, New South Wales and Southern Queensland.

26. **Acacia leprosa,** *Sieb.*, (Syn. *A. reclinata*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 358.

"Native Hickory."

Though a rather small tree, it yields excellent wood for small cabinet work and turnery.

Victoria and New South Wales.

27. **Acacia leptocarpa,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 407.

Wood dark-brown, close-grained, hard, and prettily marked; useful for cabinet and turnery work.

Queensland.

28. **Acacia linearis,** *Sims*, (Syn. *A longissima*, Wendl.); N.O., Leguminosæ, B.Fl., ii., 399.

This small tree yields wood available for minor articles of furniture, implements, etc. Specific gravity, .934. (*Report, Victorian Exhibition*, 1861.) Height, up to 20ft.

Tasmania, Victoria and New South Wales.

29. **Acacia linifolia,** *Willd.*, (Syn. *A. abietina*, Willd.; *Mimosa linifolia*, Vent.; *M. linearis*, Wendl., non Sims.); N.O., Leguminosæ, B.Fl., ii., 371.

"Sallee."

Wood soft and elastic, and suitable for axe-handles (Hill), and perhaps cabinet purposes. It is of a light colour, and reddish at the centre. Diameter, 4 to 6in.; height, 12 to 18ft.

New South Wales and Queensland.

30. **Acacia longifolia,** *Willd.*, var. **typica,** (Syn. *A. obtusifolia*, A. Cunn.; *A. spathulata*, Tausch.; *A. intertexta*, Sieb.; *Mimosa longifolia*, Andr.); N.O., Leguminosæ, B.Fl., ii., 397.

"White Sallow." Called "Golden Wattle" in Southern New South Wales. The variety *floribunda* sometimes goes by the name of "Sally," or "Sallow," in Southern New South Wales.

Timber light, tough, and hard; used for tool-handles, etc. Towards the outside it is pale yellow; the heart-wood is brown, streaked with black. Diameter, 9in.; height, 20 to 30ft.

Victoria and New South Wales.

31. **Acacia longifolia,** *Willd.*, var. **Sophoræ,** (Syn. *A. Sophoræ*, R. Brown; *Mimosa Sophoræ*, Labill.); N.O., Leguminosæ, B.Fl., ii., 398.

"Boobyalla" is an aboriginal name.

This wood is white, hard, tough, and durable. It is an excellent tree for binding coast-sands.

Sea coast from Southern Queensland to South Australia, and Tasmania.

32. **Acacia macradenia,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 362.

"Myall," or "Toney."

A beautiful, hard, blackish, close-grained wood, which takes a very high polish. Diameter, 2 to 12in.; height, 30 to 50ft.

Queensland.

33. **Acacia melanoxylon,** *R.Br.*, (Syn. *A. arcuata*, Sieb.); N.O., Leguminosæ, B.Fl., ii., 388.

Called "Blackwood" on account of the very dark colour of the mature wood. It is sometimes called "Lightwood" (chiefly in South Tasmania, while the other name is given in North Tasmania and other places), but this is an inappropriate name. It is in allusion to its weight as compared with Eucalyptus timbers. It is the "Black Sally" of Western New South Wales, the "Hickory" of the southern portion of that colony, and is sometimes called "Silver Wattle." The "Mootchong" of the Ja-jow-er-ong tribe, Victoria, and "Mooeyang" of the Yarra blacks.

This is considered by some people to be the most valuable — all Australian timbers. It is hard and close-grained; much [illegible] beautiful for furniture, picture-frames, cabinet-work, fencing [illegible] boomerangs. railway, and other carriages, boat-building (stem [illegible] and yet has ribs, rudder), for tool-handles, gun-stocks, n[illegible] unpolished it crutches, parts of organs, pianofortes (sound-bo[illegible]

billiard tables, etc. The Yarra blacks used to use it to make mulga, or club shields. The figured wood is cut into veneers. It takes a fine polish, and is considered almost equal to American walnut. In fact, when polished or ebonised, it might easily be made to replace walnut, and no doubt many of the articles alleged to be made of walnut are of this wood. It is an excellent wood for bending under steam. It warps and twists in boards over twelve inches wide unless they have been very carefully seasoned.

"This wood is largely used for oil-casks, and is the only wood we have in Australia, as far as we know, that is suitable for the purpose. It is split into staves, six by three inches thick, and six feet long." (Tenison-Woods.) It is often very dark coloured, except for about one inch of thickness of sap-wood, which is almost white. It sometimes shows a very pretty "broken grain," which looks well under polish. "Its specific gravity is from .664 to .777, *i.e.*, weight of a cubic foot of the dried wood 41lbs. to 48lbs. The yield of charcoal from the wood is 29.25 per cent.; crude wood-vinegar, 40.25; and tar, 7.062." (Mueller.)

Mr. Gamble gives the weight per cubic foot of an Indian grown specimen at 36lbs., and states that it was cut from a tree twenty years old, and ninety feet high, which gave a plank two feet broad.

"This tree has been extensively cultivated in Madras for revenue purposes, but the wood has there been found to possess few qualities prized by the cabinet-maker and builder. It warps after many months of seasoning, is not easily worked, and is not as durable as other timber accessible to the residents of the hill stations. The slowness of growth is much against the tree, and where it has been tried, in two instances, as an avenue tree, it has proved a failure. The worst feature, however, is its liability to attacks from a parasitical plant not unlike the mistletoe (*Loranthus sp.*), which spreads rapidly among the branches, and cannot be easily disengaged. . . . This parasite appears over and over as often as it is removed. As a fuel tree it is not prized so W*A. dealbata*." (*Madras Mail*, 1885.)

and perhaps cas introduced on the Nilgiris in 1840, and is now at the centre. llised. It is also being grown on the hills of the New South and Sikkim.

With regard to its rate of growth, Colonel Beddome, in his report of April, 1878, on the Nilgiri plantations, says that in the Bleakhouse plantation, Wellington (India), the average girth of the trees in the portion which is twenty-one to twenty-two years old, taken from the measurement of 30 trees as they came, was 35in. at six feet from the ground (about four rings per inch of radius), the girth of some of the largest trees being 56, 55, 50, 46 and 44in. It does not coppice well, unless very young. (Gamble.)

Following is a report by Mr. Allen Ransome on some samples of this timber sent from Victoria to the Colonial and Indian Exhibition. "Samples of both old and young trees were sent for trial. The former were made into joiners' specimens, the latter into casks. The figure of the old-growth wood is very fine, and the surface left by the cutters was all that could be desired. The casks also proved a complete success. The wood has already been imported into England in small quantities, and sold at prices ranging from 2s. to 3s. per cubic foot."

Mr. F. A. Campbell (*Proc. R.S., Victoria*, 1879) examined the tensile strength of this timber. Following are his results, in pounds per square inch. (*a*) 26,500. (*b*) 24,000. (*c*) 32,000. (*d*) 20,000. (*e*) 23,000. *d* and *e* were of a different wood from the others; much lighter in colour, more open in grain; evidently younger wood, and ill-seasoned. *a*, *b*, *c*, were from fine, close-grained, dark coloured wood, well seasoned, and extremely hard. *c* showed round the fractured part fibres like threads of silk.

Experiments on the transverse strength of the wood of *Acacia melanoxylon*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long x 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength $S = \frac{LW}{4BD^2}$	Specific Gravity.
With the apparatus weighing 780lbs.	At the crisis of breaking.			Air-dried.
Inches.	Inches.	Pounds.		
.08	.50	2296	1722	.616
.08	.54	2261	1696	.625

.ten South Aboriginals beauti- omerangs. nd yet has unpolished it

…PERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

…tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Local Name.	Botanical Name.	Locality Where Grown.	Approximate Date when the Timber was cut.	Dimensions of Tree.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Sample in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflections at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Trees grew.	Elevaton above Sea-level.
Black-wood.	Acacia melanoxylon.	Mirboo, Victoria.	6/1/83	2ft. 11in. diam.	3/1/84 7/2/84 7/2/84	8¼ 8½ 8¾	8.50		0.797		9.3.8 8.3.24 8.3.6	1030.0		5 4¾ 4	4.58			Mesozoic	700ft.
Do.	Do.	Range south of Waterloo, Victoria.	-/4/83	3ft. diam.	24/1/84 24/1/84 7/2/84	8¼ 11 9¼	9.50		0.891		7.1.26 6.3.27 5.2.2	746.3		4 4 1-16 3	3.68			Mesozoic	About 1300ft.
Do.	Do.	Do.	Seasoned at least twelve months.	—	31/1/84 31/1/84	10¼ 8¾	9.50	53.28	0.891	0.854	6.3.24 7.2.6	813.0	956.3	4 4½	4.25	4.41	2610		
Do.	Do.	Do.		—	31/1/84 4/2/84 7/2/84	8½ 8¾ 9½	8.92		0.837		10.0.0 11.1.18 11.2.22	1236.0		5⅝ 4⅞ 4⅞	5.12			Mesozoic	About 1200ft.
Do.	Do.	Tasmania.		—	24/1/84 31/1/84 4/2/84	7¼ 7 7¼	7.16	41.89	0.671	0.671	7.2.4 7.3.7 7.0.18	840.3	840.3	3¾ 4 3¾	3.83	3.83	2294		

Diameter, 18 to 36in.; height, 60 to 100ft.

Tasmania, South Australia, Victoria and New South Wales.

34. **Acacia neriifolia,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 363.

The duramen is of a light-yellow colour, the rest is of a darker colour. It is prettily marked, close-grained, and tough. Diameter, 6 to 18in.; height, 40 to 50ft.

New South Wales and Queensland.

35. **Acacia notabilis,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 365.

"Hickory."

Timber close-grained, tough, strong, durable; it splits freely, and is probably useful for turnery, etc. Diameter, 10 to 12in.; height, 25 to 30ft.

South Australia and New South Wales.

36. **Acacia Oswaldi,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 384.

Often called "Umbrella Bush," as it is a capital shade-tree. "Karagata" is an aboriginal name. "Miljee" is a name in Western New South Wales.

A small bushy tree. The timber is faintly scented, but has a very disagreeable smell when fresh. The heart-wood is dark, hard, heavy, close-grained, and durable; it is not used, but would be useful for cabinet-work, turnery, etc. The natives make short weapons, such as clubs, etc., of it. Diameter, 6 to 9in.; height, 15 to 20ft.

All the colonies except Tasmania.

37. **Acacia pendula,** *A. Cunn.*, (Syn., *A. leucophylla*, Lindl.); N.O., Leguminosæ, B.Fl., ii., 383.

"Weeping," or "True Myall." It is sometimes called "Bastard Gidgee" in Western New South Wales. Called "Boree" by aboriginals, and often "Borse," or "Silver-leaf Boree," by the colonists of Western New South Wales. "Nilyah" is another New South Wales name. By the aboriginals further north it is called "Balaar."

Wood hard, close-grained, of a rich dark colour, and beautifully marked. It is used by the aboriginals for boomerangs. It is heavy, and rarely exceeds a foot in diameter, and yet has been used for veneers. As long as it remains unpolished it

preserves its peculiar fragrance of violets, which does not occur in such perfection in any other known substance. As soon as this remarkable property became known to European manufacturers the wood came into request for making glove, handkerchief, and other fancy boxes, and especially for tobacco-pipes. Other Acacia woods are often artificially scented to imitate the true Myall, but the perfume of wood thus prepared is fugacious.

Baron Mueller has kindly named for me an Acacia growing in Western New South Wales, and known as "Yarran." He pronounces this particular "Yarran" to be *A. pendula*, var., *glabrata*. The timber possesses many of the qualities attributed to the typical *A. pendula*. Twigs with pods (accompanied by flowers) of *A. pendula* would be very acceptable at the Technological Museum. Diameter, 6 to 12in.; height, 20 to 30ft.

New South Wales and Queensland.

38. **Acacia podalyriæfolia,** *A. Cunn.*, (Syn., *A. Fraseri*, Hook.; *A. Caleyi*, A. Cunn.); N.O., Leguminosæ, B.Fl., ii., 374.

Sometimes called "Silver Wattle," as it has foliage of a more or less grey, mealy, or silvery appearance.

Wood of a pinkish colour, nicely marked.

New South Wales and Queensland.

39. **Acacia polybotrya,** *Benth.*, var. **foliolosa,** N.O., Leguminosæ, B.Fl., ii., 414.

Wood pinkish, close in grain, hard, and beautifully marked; would be a useful wood for the cabinet-maker. (*Cat. Queensland Woods, Col. and Ind. Exh., London,* 1886.)

Queensland and New South Wales.

40. **Acacia polystachya,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 407.

Wood dark-coloured and close-grained, with pretty markings.

Queensland and Northern Australia.

41. **Acacia pycnantha,** *Benth.*, (Syn. *A. petiolaris*, Lehm.; *A. falcinella*, Meissn.); N.O., Leguminosæ, B.Fl., ii., 365

Called "Golden Wattle" owing to the beautiful mass of bright-yellow flowers which adorn it. It is also called "Green Wattle," and also, for the sake of distinction between some other tan-bark Wattles, the "Broad-leaved Wattle."

This is a tough and close-grained wood. Its specific gravity is about .83, that is, the weight of a cubic foot of the wood is about 51½lbs. (Osborne.)

South Australian, Victoria and New South Wales.

42. **Acacia retinodes,** *Schlecht.*, N.O., Leguminosæ, B.Fl., ii., 362.

The wood is prettily grained, tough, and durable. Height, 20 to 25ft.

Victoria and South Australia.

43. **Acacia rigens,** *A. Cunn.*, (Syn. *A. chordophylla*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 337.

"Nealie," or "Needle Bush," of the interior.

A small tree 12 to 15ft. in height. The timber is exceedingly hard and tough, and possessed of a very agreeable perfume. The natives of the interior employ it in the manufacture of weapons.

South Australia, Victoria and New South Wales.

44. **Acacia salicina,** *Lindl.*, (Syn. *A. ligulata*, A. Cunn., including *A. varians*, Benth.); N.O., Leguminosæ, B.Fl., ii., 367.

The "Cooba," or "Koobah," of the aboriginals and colonists of Western New South Wales. "Native Willow" is another colonial name. About the Castlereagh River (New South Wales) it takes the name of "Mother-umba." "Bremgu" is the name at the Lake Hindmarsh aboriginal station (Victoria). "Bakka" is a Queensland aboriginal name.

Timber close-grained, tough, heavy, dark brown, and nicely marked. The aboriginals make boomerangs, and the colonists tables, chairs, and other furniture from it. (*General Report, Sydney International Exhibition*, 1879.) It is valued for bullock-yokes in Western New South Wales, and also for shafts of carts. Mr. G. S. Home tells me that cheffoniers, and other articles of drawing-room furniture, are commonly made from it in Western New South Wales, as it takes such a high polish. Specific gravity .763,

or weight of a cubic foot of the dried wood about 47½lbs. (Mueller.) Diameter, 12 to 18in.; height, 30 to 50ft.

All the colonies except Tasmania.

45. **Acacia saligna,** *Wendl.*, (Syn. *A. leiophylla*, Benth.; *Mimosa saligna*, Labill.); N.O., Leguminosæ, B.Fl., ii., 364. *A. leiophylla* in Muell. Cen., p. 44.

"Weeping Wattle."

This wood is prettily grained, and if larger it would be suitable for cabinet-work. Height, 10 to 30ft.

Western Australia.

46. **Acacia sentis,** *F.v.M.*, (Syn. *A. Victoriæ*, Benth.); N.O., Leguminosæ, B.Fl., ii., 360.

Usually a small, low, spreading tree. The timber is soft, but very tough, and the young twigs are armed with slender, acute spines or thorns.

In Western New South Wales the presence of this tree in any locality is always considered a sure indication of underground water. Mr. W. Scott, of Whittabranah, Grey Ranges, states that in sinking wells he has traced the roots of this Acacia down to a depth of 80 to 90ft., and it certainly looked the freshest green of all the plants of the district. Height, up to 30 or 40ft.

All the colonies except Tasmania.

47. **Acacia spinescens,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 323.

Specific gravity of the wood, 1.010. (*Report, Victorian Exhibition*, 1861.)

South Australia, Victoria and New South Wales.

48. **Acacia stenophylla,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 385.

Called "Ironwood" on account of the hard and heavy timber, and "Dalby Myall" on account of its occurrence in the vicinity of that Queensland town.

This timber is very hard, heavy, close-grained, dark, beautifully marked, and takes a fine polish. It planes excellently,

showing a very smooth surface. Diameter, 15 to 24in.; height, 40 to 60ft.

All the colonies except Tasmania and Western Australia.

49. **Acacia stricta,** *Willd.*, (Syn. *A. emarginata*, Wendl.; *Mimosa stricta*, Andr.); N.O., Leguminosæ, B.Fl., ii., 358.

"Berry-yung" is the aboriginal name at the Coranderrk Station (Victoria).

This wood is of a beautiful texture, sound and durable. It is, of course, too small to have anything but a very limited use. Height, 3 to 8ft.

Tasmania, Victoria and New South Wales.

50. **Acacia subporosa,** *F.v.M.*, (*supporosa* in Muell. Fragm. iv., 5); N.O., Leguminosæ, B.Fl., ii., 382.

A valuable wood for many purposes. It is exceedingly tough and elastic; would make good gig-shafts, handles for tools, gun-stocks, etc. Tall, straight spars, fit for masts, can be obtained of considerable length, and 18in. in diameter (L. Morton). Height, up to 40ft.

Victoria and New South Wales.

51. **Acacia tetragonophylla,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 330.

Another Acacia bearing the absurd name of "Dead Finish."

The wood of this interior species is too small for anything except whip-handles. It grows very crooked as a rule. Diameter up to a maximum of 6 or 8in.

South Australia and New South Wales.

52. **Acacia torulosa,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 405.

Wood dark brown, tough, and strong.

Queensland and Northern Australia. //

53. **Achras australis,** *R.Br.*, (Syn. *Sapota australis*, A.DC.; *Sideroxylon australe*, Benth. et Hook. f.); N.O., Sapotaceæ, B.Fl., iv., 282. *Sideroxylon australe* in Muell. Cens., p. 92.

The "Black Apple," "Brush Apple,' "Wild," or "Native Plum," of the colonists, as it has a fruit very like a plum, though of coarse, insipid flavour.

Following are some aboriginal names:—"Jerra-wa-wah," Illawarra and Brisbane Water (New South Wales); "Wycaulie," Richmond and Clarence Rivers (New South Wales); "Tchoonboy," Northern New South Wales and Southern Queensland.

The wood is close-grained, firm, prettily veined, and good for cabinet-work. (Macarthur.) Very handsome planks can sometimes be obtained from it. It is occasionally used by turners and wood-carvers. It is of a pale-yellow colour, and the complicated grain affords a pattern of a singularly pretty appearance. It is probably the unevenness of the grain (which gives rise to this pretty figuring) that is the cause of this wood being unsuitable for good engraving. It requires very careful seasoning.

Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 55lbs. 13oz. and 57lbs. 14oz. respectively per cubic foot. It is used for staves and laths, and for general building purposes. Diameter, 24 to 36in.; height, 80 to 100ft.

New South Wales and Queensland.

54. **Achras laurifolia,** *F.v.M.*, (Syn. *Sideroxylon Richardi*, F.v.M.; *S. laurifolium*, F.v.M.; *Sersalisia laurifolia*, A. Rich.; *S. glabra*, A. Gray.); N.O., Sapotaceæ, B.Fl., iv., 282. *Sideroxylon Richardi* in Muell. Cens., p. 92.

Called "Sycamore" in Southern New South Wales.

Wood light-grey towards the outside, brown in the centre; grain close. Diameter, 2 to 4ft.; height, 80 to 150ft.

New South Wales and Queensland.

55. **Achras myrsinoides,** *A. Cunn.*, (Syn. *Sideroxylon myrsinoides*, Benth. et Hook. f.); N.O., Sapotaceæ, B.Fl., iv., 283. *Sideroxylon myrsinoides* in Muell. Cens., p. 92.

Timber firm, elastic, hard, but easily worked, used for dray-poles, shafts, timber trucks, etc. Diameter, 12 to 18in.; height, 20 to 30ft.

New South Wales, Queensland and Northern Australia.

56. **Achras obovata,** *F.v.M.*, (Syn. *Sideroxylon obovatum*, R.Br.; *S. argenteum*, Spreng., (partly); *S. Brownii*, F.v.M.; *Sersalisia obovata*, R.Br.); N.O., Sapotaceæ, B.Fl., iv., 283. *Sideroxylon Brownii* in Muell. Cens., p. 92.

Wood of a yellow colour, hard, and close in the grain.

Queensland.

57. **Achras Pohlmaniana,** *F.v.M.*, (Syn. *Sideroxylon Pohlmanianum*, Benth. et Hook.; *Sapota Pohlmaniana*, F.v.M.); N.O., Sapotaceæ, B.Fl., iv., 281. *Sideroxylon Pohlmanianum* in Muell. Cens., p. 91.

"Beleam" of the aboriginals.

Wood bright yellow, hard, and close-grained; the best of all Queensland woods for engraving purposes. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Diameter, 12 to 20in.; height, 40 to 70ft.

Queensland.

58. **Acronychia Baueri,** *Schott.*, (Syn. *A. Hillii*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 366.

The "Brush Ash" of the Illawarra (New South Wales).

This wood is excellent for mallet and chisel handles. (*General Report, Sydney International Exhibition*, 1879.) Diameter, 20 to 30in.; height, 50 to 60ft.

New South Wales and Queensland.

59. **Acronychia lævis,** *Forst.*, (Syn. *A. laurina*, F.v.M.; *Lawsonia Acronychia*, Linn. f.; *Cyminosma oblongifolium*, A. Cunn.); N.O., Rutaceæ, B.Fl., i., 366.

"Yellow-wood."

This timber is of a light colour and close-grained; it is said to be durable, but it is not much used. Diameter, 24in.; height, 70 to 80ft.

Victoria, New South Wales and Queensland.

60. **Adenanthera pavonina,** *Linn.*, N.O., Leguminosæ, Muell., Cens., p. 43.

The "Barricarri" (of India). "Red Sandal-wood."

In India this tree yields a solid useful timber, which, like another dye-wood, bears the name of "Red Sandal-wood." A dye is obtained by simply rubbing the wood against a stone, and this is used by the Brahmins for marking their foreheads after religious bathing. (*Treasury of Botany.*) Gamble (*Manual of Indian Timbers*) says this wood is used in South India for house-building and cabinet-making purposes, and gives the weight at 56lbs. per cubic foot. The wood is described by Skinner as follows:—"Heart-wood hard and durable; when fresh cut of a beautiful coral-red colour, and sometimes marked with stripes of a darker shade; after exposure it turns purple, like rosewood." Kurz (*Flora of British Burmah*), describes it somewhat differently:—"Wood rather heavy, coarse, fibrous, light-brown or yellowish-grey, turning brown on exposure, hard and close-grained, soon attacked by xylophages; the heart-wood dark-brown, solid, hard and durable."

North Queensland.

61. **Ægiceras majus,** *Gærtn.*, (Syn., *Æ. fragrans*, Kœn.; *Æ. corniculata*, Blanco); N.O., Myrsineæ, B.Fl., iv., 277.

"River Mangrove."

A shrub or small tree. Wood of light colour, close-grained, and easily worked. It is used for firewood and for native huts in Jessore. It weighs 40lbs. per cubic foot. (Gamble, *Manual of Indian Timbers.*) The flowers are deliciously scented.

New South Wales, Queensland and Northern Australia.

62. **Ailanthus imberbiflora,** *F.v.M.;* N.O., Simarubeæ, B.Fl., i., 373

Wood yellow, porous, soft, and light.

Northern New South Wales and Queensland.

63. **Akania Hillii,** *Benth.*, (Syn. *Cupania lucens*, F.v.M.); N.O., Sapindaceæ, B.Fl., i., 471.

Occasionally called "Turnip wood."

Wood of a light colour, close-grained, and prettily marked; warps very much in drying, but this particular log was from a

young tree. (*Cat. Queensland Woods, Col. and Ind. Exh., London*, 1886.) Height, 30 to 40ft.

Northern New South Wales and Queensland.

64. **Albizzia basaltica**, *Benth.*, (Syn. *Acacia basaltica*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 422.

Another timber graced with the absurd name of "Dead Finish."

A shrub which furnishes a useful wood for stock-whip handles. It is extremely tough, of a good colour, like pale cedar, and takes a good polish. Its colour has been otherwise described as "sap-wood bright yellow, with a dark red heart-wood." It is fine grained, and an excellent wood for cabinet-work. The Rev. J. E. Tenison-Woods says of this timber: "Even when cut very thin and light, the wood is so tough that it will bear an enormous strain."

Queensland.

65. **Albizzia canescens**, *Benth.*, (Syn. *Pithecolobium canescens*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 423.

Called "Walkor" by some aboriginals.

Wood close-grained and tough. It is brown, resembling walnut, and nicely marked.

The sap of this wood is of a light yellow colour; wood not unlike cedar towards the centre, but harder; very much prized by cabinet-makers. (Thozet.) Diameter, 15 to 20in; height, 30 to 50ft.

Queensland

66. **Albizzia Hendersoni**, *F.v.M.*, N.O., Leguminosæ, Muell., Cens., p. 47.

The "Nuggum-nuggum" of the aboriginals of Northern New South Wales.

This timber is hard and beautifully streaked. The jurors at the Sydney International Exhibition of 1879 drew special attention to it, and said, "It seems to be remarkably tough, and very suitable for coach-building purposes." Diameter, 24 to 30in.; height, 90ft.

New South Wales and Queensland.

67. **Albizzia procera**, *Benth.*, (Syn., *A. elata*, Roxb.; *Mimosa procera*, Roxb.; *M. elata*, Roxb.; *Acacia procera*, Willd.); N.O., Leguminosæ, B.Fl., ii., 422.

"Tee-coma" of the aboriginals of the Northern Territory.

Timber close-grained, easily worked, and in use for building purposes. (Hill.) It is of a dark colour, resembling walnut, and is a useful cabinet wood. Weight of a cubic foot of Indian-grown timber (seasoned), from 39lbs. to 48lbs. It loses nearly half its weight in drying. (Brandis.) It seasons well, and the heart-wood is durable. It is used for sugar-cane crushers, rice-pounders, wheels, agricultural implements, bridges, and house-posts. It is used by tea-planters for stakes for laying out tea gardens, as it is found to split well, and occasionally for tea-boxes and charcoal, for which it is found to be very good. (Gamble.) Diameter, 18 to 24in.; height, 30 to 60ft.

Northern Australia.

68. **Albizzia Thozetiana**, *F.v.M.*, (Syn. *Acacia Thozetiana*, F.v.M.; *Pithecolobium Thozetianum*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 422.

Timber very hard, heavy, tough, and close-grained. May prove useful for gig-shafts, gun-stocks, etc. It is of a red colour. (Thozet.) Diameter, 12 to 30in.; height, 40 to 60ft.

Queensland.

69. **Albizzia Toona**, *Bail.*, Supp. to Syn. Queensland Flora. (Bailey.) N.O., Leguminosæ.

Wood of a light colour for several inches inwards from the bark; the rest resembles cedar; a valuable wood for many purposes. (*Cat. Queensland Timbers, Col. and Ind. Exh., London*, 1886.)

Queensland.

70. **Aleurites moluccana**, *Willd.*, (Syn. *A. triloba*, Forst.; *A. Ambinux*, Pers.; *Jatropha moluccana*, Linn.); N.O., Euphorbiaceæ, B.Fl., vi., 128. *A. triloba* in Muell. Cens., p. 20.

"Candle-nut."

Wood of a light colour, soft, and light; if cut when full of sap it is especially liable to decay, but it is not a durable wood under any circumstances. Weight, 38lbs. per cubic foot. It is common in the Eastern Archipelago and South Sea Islands.

Queensland.

71. **Alphitonia excelsa,** *Reisseck,* (Syn. *Colubrina excelsa,* Fenzl.); N.O., Rhamneæ, B.Fl., i., 414.

Variously called "Mountain Ash," "Red Ash," "Leather-jacket," and "Coopers' Wood." In the Illawarra district of New South Wales it is called "Humbug," while "Murr-rung" was formerly an aboriginal name in the same district. "Nono-groyinandie" has been given as a Clarence River (New South Wales) aboriginal name for this tree. The aboriginals of Northern New South Wales call it "Culgera-culgera," while some Queensland aboriginals call it "Mee-a-mee."

The wood is hard, close-grained, durable, and will take a high polish; it is suitable for gun-stocks, and a variety of other purposes. (Hill.) The timber becomes dark when old. It is valuable for coopers' staves and indoor purposes. Wood near the outside somewhat pinkish, the inner wood dark-brown, or parti-coloured throughout; very tough, and warps in drying. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 53lbs. 5oz. per cubic foot.

The Revd. J. E. Tenison-Woods points out that in Queensland this is one of the very characteristic trees of the "Brigalow" scrubs. Diameter, 18 to 24in. Height, 45 to 50ft.

New South Wales, Queensland and Northern Australia.

72. **Alsophila australis,** *R.Br.,* (Syn. *A. excelsa,* R.Br.; *A. Cooperi,* Hook. et Bak.); N.O., Filices, B.Fl., vii., 710.

A "Tree-fern." By the aboriginals of Illawarra (New South Wales) it used to be called "Beeow-wang," and by the aboriginals of Queensland "Nanga-nanga." The aboriginals at the Coranderrk Station (Victoria), call it "Pooeet."

This timber (*i.e.,* the outer hard portion) is used for walking sticks and articles of fancy furniture. It is nicely veined, and

takes a good polish. It is brown and white in streaks, the brown being very hard. The stem yields :—

Charcoal...	29 per cent.
Crude wood vinegar	44 ,,
Tar	6 ,,
Tannic acid	2.9 ,,
Gallic acid	.9 ,,

(Mueller.) Diameter, 9 to 12in. Height, 30 to 40ft.

All the colonies except South and Western Australia.

73. **Alsophila Leichhardtiana,** *F.v.M.*, (Syn., *A. Macarthurii*, F.v.M.); N.O., Filices, B.Fl., vii., 711.

"Prickly Tree-fern," called from the circumstance of the stalk being covered with sharp, black prickles. "Yarrah-wah" of the aboriginals of Illawarra (New South Wales).

Wood, or outer hard portion of stem, black with white streaks, the black portion being very hard. This description will apply to the stems of many tree-ferns. Useful for rustic-work.

New South Wales and Queensland.

74. **Alstonia constricta,** *F.v.M.*, N.O., Apocyneæ, B.Fl., iv., 314.

Called "Fever-bark," or "Bitter-bark."

Wood of a pale yellow colour, close in the grain; warps in drying. (*Cat. Queensland Woods, Col. and Ind. Exhib.*, 1886.) This tree is largely sacrificed for its medicinal bark, and the timber apparently goes to waste. Diameter, 6 to 15in. Height, 40 to 70ft.

New South Wales and Queensland.

75. **Alstonia scholaris,** *R.Br.*, (Syn. *A. cuneata*, Wall.); N.O., Apocyneæ, B.Fl., iv., 312.

"Devil Tree" (of India).

The light wood of this tree is used in Ceylon for making coffins. (*Treasury of Botany.*) It obtained the specific name "scholaris" from the fact of its planks being used as school-boards when covered with sand for tracing letters. It is white and

close-grained. (Drury.) The wood varies in weight from 28 to 40lbs. per cubic foot. Height, up to 80 or 90ft.

Northern Queensland.

76. **Alstonia verticillosa,** *F.v.M.,* (Syn. *Alyxia actinophylla,* A. Cunn.); N.O., Apocyneæ, B.Fl., iv., 313.

Wood of light colour, soft and easy to work.

Queensland and Northern Australia.

77. **Alstonia villosa,** *Blume,* N.O., Apocyneæ, B.Fl., iv., 313.

Wood of a light colour, close in the grain, works easily, is firm, and would probably be suitable for staves. (*Cat. Queensland Timbers, Col. and Ind. Exh.,* 1886.) This tree is not endemic in Australia. Height, up to 30ft.

Queensland.

78. **Alyxia buxifolia,** *R.Br.,* (Syn. *A. capitellata,* Benth.); N.O., Apocyneæ, B.Fl., iv., 307.

Called "Tonga-bean Wood" owing to its scent; also "Heath-box."

This straggling sea-side shrub, with a stem three to five inches in diameter, has a fine and close-grained wood, of a lightish-brown mottled appearance. It smells strongly of Coumarin.

All the colonies except Queensland.

79. **Amoora nitidula,** *Benth.,* N.O., Meliaceæ, B.Fl., i., 383.

"A tall tree." Wood of a light colour, tough, and close in the grain.

Northern New South Wales and Queensland

80. **Angophora intermedia,** *DC.,* (Syn. *Metrosideros floribunda,* Smith); N.O., Myrtaceæ, B.Fl., iii., 184.

"Narrow-leaved Apple Tree." *Angophoras* are called "Apple Trees" in the colonies, from a fancied resemblance to those trees.

This timber is subject to gum-veins, but when free from those defects it is used for naves and spokes of wheels, blocks, etc., and is cut into boards. It bears dampness well, and is hard and tough. It burns freely. Diameter, 24 to 36in.; height, 80 to 100ft.

Victoria, New South Wales and Queensland.

81. **Angophora lanceolata,** *Cav.*, (Syn. *Metrosideros costata,* Gærtn.; *M. lanceolata,* Pers., Syn. ii., 25; *M. apocynifolia,* Salisb.); N.O., Myrtaceæ, B.Fl., iii., 184.

Variously called "Apple Tree," "Mountain Apple Tree," "Orange Gum," "Red Gum," or "Rusty Gum," in allusion to the bark being stained a rusty-red colour from the kino. Some Queensland aboriginals call it "Toolookar."

Timber strong, heavy, subject to gum-veins; used for naves of wheels, slabs, rough buildings and fuel. "Specific gravity .893." (*Report, Victorian Exhibition,* 1861.) Diameter, 24 to 36in.; height, 70 to 80ft.

New South Wales and Queenland.

82. **Angophora subvelutina,** *F.v.M.*, (Syn. *A. velutina,* F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 184.

"Broad-leaved Apple Tree." The "Illarega" of the aboriginals of the Richmond and Clarence Rivers (New South Wales).

The wood is moderately heavy and tough, soft while green, very hard when dry; it is used for wheel-naves, bullock-yokes, handles, etc.; it turns well, and contains a large proportion of potash. (Hartmann.) It is durable, and is used for posts and rails. It is of a uniform reddish colour, requires careful seasoning; dresses and polishes well. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 52lbs. 14oz. per cubic foot.

New South Wales and Queensland.

83. **Angophora Woodsiana,** *Bail.*, (Syn. Queensland Flora, Bailey.); N.O., Myrtaceæ.

Wood of a pinkish colour, hard and heavy.

Queensland.

84. **Aphananthe phillippinensis,** *Planch.*, (Syn. *Taxotrophis rectinervis,* F.v.M.; *Sponia ilicifolia,* S. Kurz.); N.O., Urticeæ, B.Fl., vi., 160.

Called by the colonists "Elm" and "Tulip-wood," and by the aborigines of the Richmond and Clarence Rivers, "Mail."

This timber is used for linings, ceilings, etc. It may be found a useful wood for turners. It is close-grained, light in colour, and Mr. Bailey suggests that it might do for stamps. It is not endemic in Australia. Diameter, 15 to 18in. Height, 80 to 90ft.

Northern New South Wales and Queensland.

85. **Apophyllum anomalum,** *F.v.M.*, N.O., Capparideæ, B.Fl., i., 97.

Wood very hard. Diameter, 6 to 16in. Height, 20 to 30ft.

New South Wales, Queensland and Northern Australia.

86. **Araucaria Bidwilli,** *Hooker*, N.O., Coniferæ, B.Fl., vi., 243.

The "Bunya-bunya" of the aboriginals—a name invariably adopted by he colonists.

The wood is not only very strong and good, but it is full of beautiful veins, and capable of being polished and worked with the greatest facility. (Hill.) It is not allowed by the Government to be felled on Crown Lands owing to its seed yielding an article of food to the aborigines. (See "Foods.")

A sample of this timber was sent to the Colonial and Indian Exhibition, and examined by Mr. Allen Ransome. He states: "This is a straight-grained, light-coloured, mild-working wood, often prettily marked. Judging by the experiments, it should make excellent framing, and as it planes well could be used for common furniture, as it is not inclined to warp or twist." Diameter, 30 to 48in.; height, 100 to 150ft.

An allied species *A. exelsa* ("Norfolk Island Pine") sometimes has knots of enormous size. Mr. Holtzapfel (*Turning and Mechanical Manipulation*, i., 37) had portions of one which attained the enormous size of about four feet long, and four to six inches diameter. "In substance it is very compact and solid, of a semi-transparent hazel-brown, and it may be cut almost as well as ivory, and with the same tools, either into screws, or with eccentric or drilled work, etc.; it is an exceedingly appropriate material for ornamental turning."

Queensland.

87. **Araucaria Cunninghamii**, *Ait.*, N.O., Coniferæ, B.Fl., vi., 243.

Called variously "Moreton Bay Pine," "Hoop Pine," and "Colonial Pine." By the aboriginals of the Richmond River (New South Wales) it is called "Coorong," by those about Brisbane, "Cumburtu," and by those about Wide Bay (Queensland), "Coonam."

The timber is an article of great commercial importance. It is strong and durable when dry, but it soon decays when it is exposed to alternate damp and dryness. When procured from the mountains in the interior of Queensland it is fine-grained, and susceptible of a high polish, equal to that of satin-wood or bird's-eye maple. (Hill.) The pine obtained from the mountains is preferred to that obtained from the low lands near the coast.

A piece of this timber was exhibited at the London International Exhibition of 1862, and is thus referred to:—"A noble specimen, which is remarkable for the peculiar figure set up, by a series of remote, small, pea-shaped, pale clouded knots, arranged in quincunx order, somewhat like drops of rain in general effect, and not easily described. The sap-wood appears peculiarly liable to rot." It yields spars 80 to 100ft. long, and one tree has been known to yield 10,000ft. of timber. It is pale coloured, and extensively used for flooring and lining boards, also for punt-bottoms when kept constantly wet. It is apt to get of a dirty colour with age. The specific gravity has been given (Sydney Mint Experiments, 1860) at .763. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 30lbs. 2oz. and 33lbs. 12oz. respectively per cubic foot, or, in round numbers, a specific gravity of about .5.

Mr. Allen Ransome thus reports on a sample of this timber sent from Queensland to the Colonial and Indian Exhibition: "This is a rather harder and better wood than the last mentioned, (*A. Bidwilli*). It is of a light colour, with a straight grain, and planes very smooth with a rapid feed." Diameter, 36 to 66in. Height, 150 to 200ft.

Northern New South Wales and Queensland.

88. **Archidendron Vaillantii,** *F.v.M.*, N.O., Leguminosæ, Muell. Cens., p. 47.

Wood of a red colour, close-grained, strong, and durable.

Queensland.

89. **Areca Normanbyi,** *F.v.M.*, (Syn. *Ptychosperma Normanbyi*, F.v.M.; *Cocos Normanbyi*, W. Hill); N.O., Palmeæ, B.Fl., vii., 142.

"Black Palm."

Wood, or outer part of the stem, very hard and black, beautifully marked; used in the manufacture of walking sticks; about 50ft. high.

Queensland.

90. **Argophyllum Lejourdanii,** *F.v.M.*, N.O., Saxifrageæ, B.Fl., ii., 436.

Wood yellow, close-grained, and hard, but, of course, very small. A shrub of 6 to 8ft. high.

Queensland.

91. **Atalantia glauca,** *Hook. f.*, (Syn. *Triphasia glauca*, Lindl.); N.O., Rutaceæ, B.Fl., i., 370.

The "Native Kumquat," or "Desert Lemon."

The wood is close-grained, and takes a fine polish. It is of a bright yellow colour, with numerous brown streaks or veins. Diameter, 2 to 6in. Height, 8 to 15ft.

New South Wales and Queensland.

92. **Atalaya hemiglauca,** *F.v.M.*, (Syn. *Thouinia hemiglauca*, F.v.M.); N.O., Sapindaceæ, B.Fl., i. 463.

Commonly called "Whitewood."

A tall shrub, or small tree. Wood yellowish, hard, and of close grain.

South Australia, New South Wales and Queensland.

93. **Atalaya salicifolia,** *Blume.*, (Syn. *Sapindus salicifolius*, DC.; *Cupania salicifolia*, DC.; *Thouinia australis*, A. Rich.); N.O., Sapindaceæ, B.Fl., i., 463.

Timber close-grained and hard, and takes a good polish. (Hill.) It is not endemic in Australia. Diameter, 14 to 22in.; height, 30 to 50ft.

Northern Australia.

94. **Atherosperma moschata,** *Labill.*, N.O., Monimiaceæ, B.Fl., v., 284.

"Sassafras."

The wood is very suitable for sash and door work. It is useful to the cabinet-maker also, for it has a dark duramen, and frequently exhibits a pleasant figure; it has also the quality of taking a beautiful polish. It is said to be peculiarly suitable for the sounding boards of musical instruments. It is close-grained, very tough, easily worked, and much esteemed for shoemakers' lasts, and also for carpenters' bench screws. Height, up to 100 or 150ft. in Tasmania.

New South Wales, Victoria and Tasmania.

95. **Avicennia officinalis,** *Linn.*, (Syn. *A. tomentosa*, Jacq.); N.O., Verbenaceæ, B.Fl., v., 69.

The "Mangrove," or "White Mangrove." The "Tchoonchee" of some Queensland aboriginals, and the "Tagon-tagon" of those of Rockhampton (Queensland); and "Egaie" of those of Cleveland Bay.

Its wood, when small, is valuable on account of its inlocked fibre, for stonemasons' mallets, and is used for knees of boats and vessels (Macarthur), also yokes for bullocks. The sawdust is particularly pungent and fœtid. (Guilfoyle.) Its weight is 58lbs. per cubic foot. In India it is by some considered a brittle wood, and used only for fuel. Major Ford, however, says it is used for mills for husking paddy, rice-pounders and oil mills, in the Andamans. (Gamble.) It discolours on keeping, and is very hard to dress, both on account of its chipping under the plane, and of the coarseness of the grain. It requires to be seasoned very carefully. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 49lbs. 3oz. per cubic foot. Diameter, 20in.; height, 20 to 30ft.

In salt-water estuaries extending along the Australian sea-coast.

96. **Backhousia Bancroftii,** *F.v.M. et Bail.*, N.O., Myrtaceæ, *Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.

"Langdon's Hardwood."

Wood of a light-grey colour, hard, close-grained, something like teak, useful as a building timber; rather dark towards the centre in large trees; splits straight and freely. (Bailey.)

Johnstone River (Queensland).

97. **Backhousia citriodora,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 270.

The wood is hard, fine-grained, and likely to be useful for ornamental purposes. It is of a light-pink colour. Diameter, 9 to 12in.; height, 18 to 20ft.

Queensland.

98. **Backhousia myrtifolia,** *Hook. and Harv.*, (Syn., *B. riparia*, Hook.); N.O., Myrtaceæ, B.Fl., iii., 269.

"Scrub Myrtle," or "Native Myrtle," or "Grey Myrtle." "Lancewood."

Wood close-grained, of a light-yellow colour, and often prettily marked with dark walnut stains. It is used for tool handles, mallets, etc. It is suitable for turnery, and perhaps for wood engraving. Boys (in the early days of the colony at least) used to make bows of this tough and durable wood. Diameter, 9 to 12in.; height, 20 to 40ft.

New South Wales and Queensland.

99. **Backhousia scadiophora,** *F.v.M.;* N.O., Myrtaceæ, B.Fl., iii., 270.

"Myrtle."

Timber hard, close-grained, and prettily marked; not generally used or known, but considered likely to be useful for wood engraving. Diameter, 24in.; height, 80 to 90ft.

New South Wales and Queensland.

100. **Baloghia lucida,** *Endl.* (Syn., *Codiæum lucidum,* Muell., Arg.); N.O., Euphorbiaceæ, B.Fl., vi., 148.

"Scrub," or "Brush Bloodwood." Called also "Roger Gough." Used to be called "Nulliera" by Brisbane Water aboriginals. The "Nun-naia" of the aboriginals of the Clarence River. The "Dooragan" of some Northern New South Wales aboriginals.

Wood fine and close-grained. It is impregnated with a resinous substance, and burns readily in a green state. It is of a buff or even light reddish-brown colour, apparently evinces no tendency to split, and is probably a very useful timber. Some specimens of it are rather pretty when polished. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 44lbs. and 45lbs. 4oz. per cubic foot respectively. Diameter, 24 to 30in.; height, 70 to 80ft.

New South Wales and Queensland.

101. **Banksia æmula,** *R.Br.,* (Syn., *B. serrata,* Cav. non Linn. f.; *B. serratifolia,* Salisb.; *B. serræfolia,* Knight; *B. elatior,* R.Br.; *B. undulata,* Lindl.); N.O., Proteaceæ, B.Fl., v. 556.

A shrub. Wood deep red, coarse-grained, prettily marked, shrinks unequally in drying; an excellent wood for the cabinet-maker. (*Cat. Queensland Woods, Col. and Ind. Exh.,* 1886.)

New South Wales and Queensland.

102. **Banksia dentata,** *Linn., f.,* N.O., Proteaceæ, B.Fl., v., 555.

Wood of a dark-red colour, hard, close grained, and prettily marked. Height, 15 to 20ft.

Queensland and Northern Australia.

103. **Banksia integrifolia,** *Linn.,* (Syn. *B. spicata,* Gærtn.; *B. oleifolia,* Cav.; *B. macrophylla,* Link.; *B. compar,* R.Br.); N.O., Proteaceæ, B.Fl., v., 554.

The ordinary name of a *Banksia* in the colonies is "Honeysuckle." This species is commonly called "Honeysuckle," or "Coast Honeysuckle," and "Beef-wood," from the colour and texture of the wood. It is the

"Courridjah" of the aboriginals of Cumberland and Camden (New South Wales), and the "Pomera" of Queensland aboriginals.

Timber tough; used for knees of boats, bullock yokes, etc. It is moderately dense, pinkish in colour, and beautifully grained; suitable for fancy work; very perishable when exposed to atmospheric influences, but otherwise durable. Specific gravity of wood, .799; weight of a cubic foot of dry wood about 50lbs. (Mueller.) Diameter, 8 to 12in. Height, 20 to 30ft.

A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 39lbs. per cubic foot.

Victoria, New South Wales and Queensland.

104. **Banksia littoralis,** *R.Br.*, N.O., Proteaceæ, B.Fl., v., 547.

This wood is beautifully grained, of a rich brown colour, and suitable for cabinet and inlaid work. Height, 20 to 40ft.

Western Australia.

105. **Banksia marginata,** *Cav.*, (Syn. *B. microstachya*, Cav.; *B. oblongifolia*, Lodd.; *B. australis*, R.Br.; *B. depressa*, R.Br.; *B. patula*, R.Br.; *B. insularis*, R.Br.; *B. Gunnii*, Meissn.); N.O., Proteaceæ, B.Fl., v., 553.

"Honeysuckle." The "Wallum" of the aboriginals of Wide Bay (Queensland). "Woreck" of the aboriginals of the Lake Hindmarsh Station (Victoria).

This wood is not of much utilitarian importance. It is remarkably porous, soft, spongy, and light. When full of sap and newly cut, it is not unlike uncooked beef in the centre, and towards the surface of a reddish-white colour, hence it has the appearance of well-grown beef, with a quantity of fat on the outside. In the process of drying it twists and warps to a great extent, but when thoroughly seasoned it admits of a fine polish, and has a very pleasing appearance. It is used for cabinet purposes and indoor ornamental work. (J. E. Brown.) A cubic foot of the wood, when dry, weighs 38lbs., equivalent to a specific gravity of .598. (In the *Report of the Victorian Exhibition*, 1861, the specific gravity is given as .610.)

Yield of charcoal ...	...	29.5 per cent.
Crude wood vinegar	...	40.062 „
Tar	...	6.562 „

A ton of dry wood gave a maximum yield of 14¼lbs. of pearl-ash, or 6½lbs. of pure potash. (Mueller.) Height, 10 to 20ft.

South Australia, Tasmania, Victoria and New South Wales.

106. **Banksia serrata,** *Linn. f.*, (Syn. *B. conchifera*, Gærtn.; *B. mitis*, Knight; *B. dentata*, Wendl. non Linn. f.; *B. media*, Hook. f., non R.Br.); N.O., Proteaceæ, B.Fl., v., 556.

"Honeysuckle." Formerly called by the aboriginals of Cumberland and Camden (New South Wales) "Wattung-urree."

This tree produces a handsome wood, but it is always bored by the larvæ of coleopterous insects. It yields a purplish, mahogany-coloured wood, of remarkable colour, of coarse, open grain, and strong; forms a mottled figure in certain sections. Used for window frames. (*Jurors' Reports, London International Exhibition*, 1862.) It is available for boat and ship-building purposes, not being liable to split with nailing; it is used as knees, etc., and would make good furniture. (*General Report, Sydney International Exhibition*, 1879.) Specific gravity, .803; weight of cubic foot of dried wood, about 50lbs. (Mueller.) Like other Banksia woods it requires to be seasoned very carefully. The figure of Banksia timber is quite *per se*, and can rarely be mistaken. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 38lbs. 14oz. per cubic foot.

Tasmania, Victoria, New South Wales and Queensland.

107. **Barkleya syringifolia,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 275.

Wood hard, close-grained, and of a blackish-grey colour. It might be suitable for tool handles. This tree is, however, of greater value to the horticulturist than to the timber merchant, its pleasant foliage and luxuriant yellow flowers rendering it a pretty object in gardens. Diameter, 12 to 15in.; height, 40 to 50ft.

New South Wales and Queensland.

108. **Barringtonia acutangula,** *Gaertn.*, (Syn. *Stravadium rubrum*, DC.); N.O., Myrtaceæ, B.Fl., iii., 288.

A large tree; the wood is hard and of a fine grain, red, and equivalent to mahogany, according to Mr. McClelland. It is used in India for boat-building, well-work, carts, rice-pounders, and by cabinet-makers. Its weight is 46lb. per cubic foot. (Gamble.) Beddome says it turns black when buried in mud.

Northern Australia.

109. **Barringtonia speciosa,** *Linn. f.*, N.O., Myrtaceæ, B.Fl., iii., 288.

A large tree; wood of a yellow colour, tough, and firm; might be useful in cabinet-work.

Queensland.

110. **Bauhinia Carronii,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 295.

"Queensland Ebony." Called "Pegunny" by the aboriginals of the Cloncurry River, Northern Queensland (Myappe tribe), and "Thalmera" by the Mycoolan tribe.

Wood light-brown, but becoming much darker towards the centre, hard, heavy, close in the grain; suitable for cabinet-work. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

South Australia, New South Wales and Queensland.

111. **Bauhinia Hookeri,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 296.

"Mountain," or "Queensland Ebony." "Warwor" of some Queensland aboriginals.

Wood supple and heavy; of a dark-reddish hue. Will answer well for veneers (Thozet). Diameter, 10 to 20in.; height, 30 to 40ft.

Queensland and Northern Australia.

112. **Bedfordia salicina,** *DC.*, (Syn. *Cacalia salicina*, Labill.; *Senecio Bedfordii*, F.v.M.; *Culcultitium salicinum*, Spreng.); N.O., Compositæ, B.Fl., iii., 673. *Senecio Bedfordii*, in Muell. Cens., p. 84.

The "Dog-wood" of Tasmania, and the "Cotton-wood" of Southern New South Wales, on account of the abundant down on the leaves.

A hard, pale-brown, well-mottled wood, said by some to be good for furniture. It emits a fœtid smell when cut. Specific gravity of a steam-dried specimen, .896 (Osborn). It is little used in Southern New South Wales on account of its brittle nature. Mr. Bäuerlen has pointed out that fresh shavings of this wood change colour in a remarkable manner. It is exceptionally difficult to season. Height, up to 30ft.

Tasmania, Victoria and New South Wales.

113. **Beyeria viscosa,** *Miq.*, (Syn. *B. oblongifolia,* Hook. f.; *Croton viscosum*, Labill.; *Calyptrostigma viscosum*, Klotzsch.; *C. oblongifolinm*, Klotzsch.); N.O., Euphorbiaceæ, B.Fl., vi., 64.

"Pink-wood" of Tasmania. Sometimes called "Wallaby bush."

"A tall shrub or tree." The wood is used for sheaves of blocks, and for turnery. It is remarkable for hardness and uniformity of colour and grain; it is of a very pale-reddish mahogany hue.

All the colonies.

114. **Blepharocarya involucrigera,** *F.v.M.*, Muell. Cens., p. 25, N.O., Sapindaceæ.

Wood of a light-red colour, of a close grain, soft, and easy to work.

Queensland.

115. **Bombax malabaricum,** *DC.*, (Syn., *B. heptaphyllum*, Cav.; *Salmalia malabarica*, Schott.); N.O., Malvaceæ, B.Fl., i., 223.

The "Malabar Silk Cotton Tree" (of India).

A large tree; in India this wood is not considered durable, except under water. It is light, coarse-grained, and soft. It is used for planking, packing-cases, tea boxes, toys, scabbards, fishing-floats, coffins, and the lining of wells. In Bengal and Burmah the trunk is often hollowed out to make canoes. The

weight of a cubic foot of the wood varies between 20 and 32lb. (Gamble.)

Queensland and Northern Australia.

116. **Bosistoa sapindiformis**, *F.v.M.*, (Syn., *Evodia pentacocca*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 359.

"Union Nut." The "Daurah," or "Towra," of the Queensland aborigines.

Timber close-grained, yellowish, beautifully marked, easily wrought, and suitable for cabinet-work. It is, however, liable to split in drying. Diameter, 9 to 12in.; height, 20 to 30ft.

Northern New South Wales and Queensland.

117. **Brassaia actinophylla**, *Endl.*, N.O., Araliaceæ, B.Fl., iii., 385.

"Umbrella Tree," the large leaves being set, like umbrella-ribs, at the top of numerous stems. "Pinankaral" of the aboriginals.

Wood soft, close-grained, and dark in colour. It is not durable. Diameter, 6 to 12in.; height, 30 to 40ft.

Queensland.

118. **Breynia oblongifolia**, *Muell. Arg.*, (Syn. *B. cinerascens*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 114.

Wood straw-coloured, close-grained, and firm, but, of course, quite small. A shrub of 10 to 15ft.

New South Wales and Queensland.

119. **Bridelia exaltata**, *F.v.M.*, (Syn. *B. ovata* var. *exaltata*, Muell. Arg.; *Amanoa ovata*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 119.

The "Biggera-biggera" of the aboriginals of Northern New South Wales.

This wood is brown, hard, and close in the grain; somewhat resembling walnut, and said to be as suitable for cabinet-work. Diameter, 24 to 30in.; height, 90 to 100ft.

Northern New South Wales.

120. **Bridelia faginea**, *F.v.M.*, (Syn. *Amanoa faginea*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 120.

"A tall shrub or small tree." Wood greyish-brown, mottled, becomes darker towards the centre; an easily-worked wood; suitable for cabinet-makers. *(Cat. Queensland Timbers, Col. and Ind. Exh.,* 1886.)

Queensland.

121. **Bruguiera gymnorrhiza,** *Lam.*, N.O., Rhizophoreæ, B.Fl., ii., 495.

See *B. Rheedii.*

Queensland and Northern Australia.

122. **Bruguiera Rheedii,** *Blume*, (Syn. *B. australis*, A. Cunn.; *B. Rumphii*, Blume); N.O., Rhizophoreæ, B.Fl., ii., 494. *B. gymnorrhiza* and *B. Rheedi* are united by some authors.

"Red Mangrove." The "Kowinka" of Queensland aborigines.

This wood is hard and durable, and of a yellowish colour, or reddish brown, with the sap-wood lighter coloured. It is close-grained and coarse-fibrous, useful for many purposes, especially axe and pick handles. It is a common Indian tree. Gamble *(Manual of Indian Timbers)* gives its weight as 54lb. per cubic foot, and states that it is used for firewood, house posts, planks, and articles of native furniture.

The aerial roots of this tree are used by the Fijians for making bows. (Seemann, *Flora Vitiensis.)*

Queensland and Northern Australia.

123. **Buchanania mangoides,** *F.v.M.*, N.O., Anacardiaceæ, Muell. Cens., p. 25.

Called "Plum Tree" in Northern Australia.

Wood of a pinkish colour, close in the grain, tough, and easy to work. *(Cat. Queensland Woods, Col. and Ind. Exh.,* 1886.)

Queensland.

124. **Bursaria spinosa,** *Cav.*, (Syn. *Itea spinosa*, Andr. Also **B. spinosa** var. **incana,** *Benth.*, (Syn. *B. incana*, Lindl.); N.O., Pittosporeæ, B.Fl., i., 115.

"Native Box," or "Box Thorn." "Native Olive." "Kurwan" of the aboriginals at Coranderrk (Victoria). "Geapga" of those of Lake Hindmarsh Station (Victoria).

The wood is close-grained, white in colour, and takes a fine polish. It is used for turnery. Its scent is pleasant, but fleeting. Diameter, 6 to 9in.; height, 20 to 30ft.

All the colonies.

125. **Cadellia monostylis,** *Benth.*, N.O., Simarubeæ, B.Fl., i., 375.

Wood of a yellowish colour, somewhat resembling some kinds of walnut and satin-wood. It is of a pretty grain, and would be useful for cabinet-work and for toy making. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

126. **Callicoma serratifolia,** *Andr.*, N.O., Saxifrageæ, B.Fl., ii., 440.

"Native Beech." This is one of the trees called by the early colonists "Black Wattle," from the fancied resemblance of the flowers to those of some of the wattles.

This wood has a reddish tint, and seems easy to work. Diameter, up to 12in. Height, 50 to 60ft.

New South Wales and Queensland.

127. **Callistemon lanceolatus,** *DC.*, (Syn. *C. marginatus*, DC.; *C. scaber*, Lodd.; *Metrosideros lanceolata*, Smith; *M. citrina*, Curtis, *Bot. Mag.*; *M. lophantha*, Vent.; *M. marginata*, Cav.; *M. rugulosa*, Sieb.; *M. semperflorens*, Lodd.); N.O., Myrtaceæ, B.Fl., iii., 120.

"Red Bottle-brush." (The flowers of some species of *Callistemon* are like bottle-brushes in shape.) "Water Gum." The "Marum" of some Queensland aboriginals.

Wood hard and heavy; it is used for ship-building, wheelwrights' work, and many implements, such as mallets. Its shavings will bind like a ribbon. Diameter, 12 to 18in. Height, 30 to 40ft.

Victoria, New South Wales and Queensland.

128. **Callistemon salignus,** *DC.*, (Syn. *C. pallidus*, DC.; *C. lophanthus*, Lodd.; *Metrosideros saligna*, Smith; *M. pallida*, Bonpl.); N.O., Myrtaceæ, B.Fl., iii., 120.

Called "Broad-leaved Tea-tree," "River Tea-tree," "Stonewood," and "River Oak." It is the "Unoyie" of the aboriginals of Northern New South Wales. "Humbah" is another aboriginal name.

Wood very hard and close-grained; it has the reputation of being very durable underground. It has been used for engraving, but with no marked success. An engraving in which this wood is used will be found at page 50 of the *Proc. Philosoph. Inst. of Victoria* for 1859. It varies in colour from a uniform drab to dark red, and some specimens have a very pretty grain which looks well under polish. It is fairly easy to work, and dresses admirably. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 56lb. 13oz. and 60lb. 12oz. per cubic foot respectively. Specific gravity .983 (61⅓lb. per cubic foot). (*Report Victorian Exhibition*, 1861). Diameter, 18 to 24in. Height, 40 to 50ft.

All the colonies except Western Australia.

129. **Calophyllum inophyllum,** *Linn.*, N.O., Guttiferæ, B.Fl., i., 183.

"Ndilo" (of India).

Wood of a reddish colour, and pretty wavy figure, strong and durable; a useful wood for the joiner and cabinet-maker.

This tree is also a native of India, where it is used for masts, spars, railway-sleepers, machinery, etc. The weight is 63lb. per cubic foot, according to Kurz; "the specimens received by me averaged 42lb." (Gamble, *Manual of Indian Timbers.*)

Queensland.

130. **Calophyllum tomentosum,** *Wight*, Muell. Cens., p. 8, (Syn. *C. elatum*, Bedd.); N.O. Guttiferæ.

"Poon Tree" (of India).

This tree yields the Poon Spars of commerce, of which good ones fetch large prices. The timber is used for bridge-work in India, is of a red colour, strong, and durable; it also is useful to the joiner and cabinet-maker. "Couch's experiments at Plymouth

Dockyard gave 36 to 43lb. per cubic foot, mine gave 35lb. per cubic foot." (Gamble, *Manual of Indian Timbers.*)

Queensland.

131. **Canarium australasicum,** *F.v.M.*, N.O., Burseraceæ, B.Fl., i., 377.

Wood of a grey colour, dark towards the centre; works easily, and would suit for lining-boards of houses.

Queensland and Northern Australia.

132. **Canthium buxifolium,** *Benth.*, (Syn. *Plectronia buxifolia*, Benth.); N.O., Rubiaceæ, B.Fl., iii., 422.

The various species of *Canthium* are tall shrubs or small trees. In this species the wood is of a light colour, close in the grain, and useful for turnery and cabinet-work.

New South Wales and Queensland.

133. **Canthium coprosmoides,** *F.v.M.*, (Syn. *C. barbatum*, Seem.; *Plectronia barbata*, Hook. f.; *Chiococca barbata*, G. Forst.; *C. odorata*, Hook. et Arn.); N.O., Rubiaceæ, B.Fl., iii., 422. Muell. Fragm., ix., 186.

Wood dark yellow, streaked with a brown colour, very prettily marked or grained; a useful wood for turnery and cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales, Queensland and Northern Australia.

134. **Canthium latifolium,** *F.v.M.*, (Syn. *Plectronia latifolia*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 421.

"Mogil-Mogil." "Wild Orange," or "Wild Lemon."

A small tree; the timber is hard and close-grained, but seldom used. It is, nevertheless, somewhat ornamental, being pinkish, with streaks of a darker colour. Diameter, 3 to 6in.; height, 16 to 20ft.

In the interior of all the colonies except Tasmania and Victoria.

135. **Canthium lucidum,** *Hook. et Arn.*, (Syn. *C. lamprophyllum*, F.v.M.; *C. odoratum*, Seem.; *Plectronia odorata*, F.v.M.; *Coffea odorata*, G. Forst.; *Ixora odorata*, Spreng.; *Pavetta dubia*, Endl.); N.O., Rubiaceæ, B.Fl., iii., 421; Muell. Cens., ix., 185.

Wood of a yellow colour, close-grained, tough, and nicely marked; likely to prove useful for cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) Diameter, 6 to 12in.; height, 20 to 30ft.

New South Wales to Northern Australia.

136. **Canthium oleifolium,** *Hook.*, N.O., Rubiaceæ, B.Fl., iii., 422.

Wood hard, close-grained, and capable of a high polish. Thozet says this shrub is met with in poor soil. Diameter, 5 to 10in.; height, 25 to 30ft.

The interior of New South Wales and Queensland.

137. **Canthium vacciniifolium,** *F.v.M.*, (Syn. *C. microphyllum*, F.v.M.; *Plectronia vacciniifolia*, Hook. f.); N.O., Rubiaceæ, B. Fl., iii., 422.

Wood close grained; used for walking-sticks. (Hill.) It is tough, and of a light-yellowish colour. Diameter, 1 to 4in.; height, 20ft.

New South Wales and Queensland.

138. **Capparis Mitchelli,** *Lindl.*, (Syn. *Busbeckia Mitchelli*, F.v.M.); N.O., Capparideæ, B.Fl., i., 96.

"Small Native Pomegranate," "Native Orange" (from the size and shape of the fruit). "Karn-doo-thal" of the aboriginals of the Cloncurry River (Northern Queensland), and "Mondo" of the aboriginals of Central Queensland.

The wood is whitish, hard, close-grained, and suitable for engraving, carving, and similar purposes. Sir Thomas Mitchell, who discovered this small tree, says (*Three Expeditions*, ii., 137), "The wood resembles lancewood so much as not to be distinguished from it." Diameter, 10 to 14in.; height, 14 to 20ft

All the colonies except Tasmania and Western Australia.

139. **Capparis nobilis,** *F.v.M.*, (Syn. *Busbeckia arborea*, F.v.M.; *B. nobilis*, Endl.); N.O., Capparideæ, B.Fl., i., 95.

"Native Pomegranate." "Grey Plum." "Caper Tree."

The timber is hard and close-grained, of a light or whitish colour, and likely to prove useful for carving. Mr. C. Moore says it is occasionally used for whip handles. Diameter, 6 to 14in.; height, 20 to 25ft.

New South Wales and Queensland.

140. **Carallia integerrima,** *DC.*, (Syn. *C. zeylanica*, Arn.; *C. lucida*, Roxb.); N.O., Rhizophoræ, B.Fl., ii., 495.

Wood light-coloured, but darkening prettily towards the centre, close in the grain, easy to work, and polishes well. It is used in Burmah for planking, furniture, and rice-pounders; in Ceylon for furniture, and also for building purposes. The sap-wood is perishable, but the heart-wood is very hard and durable. Weight, 47lb. per cubic foot. (Gamble.)

Queensland and Northern Australia.

141. **Cardwellia sublimis,** *F.v.M.*, N.O., Proteaceæ, B.Fl., v., 538.

Wood of a light colour, prettily marked; perhaps suitable for cabinet-work. Height, 80 or 90ft.

Central Queensland.

142. **Careya arborea,** *Roxb.*, var. (?) **australis,** F.v.M., (Syn. *C. australis*, F.v.M.; *Barringtonia Careya*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 289. *Careya australis* in Muell. Cens., p. 60.

"Broad-leaved Apple Tree." "Barror" of some Queensland aboriginals. Variously called "Go-onje" and "Gunthamarra" by the aboriginals of the Cloncurry River (Northern Queensland), and "Ootcho" by the aboriginals of the Mitchell River.

"A tree attaining a large size." Wood of a light-grey colour, red in the centre, close in the grain, and tough; works easily, liable to crack unless very carefully seasoned.

Of the typical *C. arborea*, Gamble says the wood was perfectly sound after being stored for 50 years in Calcutta. The

wood is little used in India except for agricultural implements. It is being tried for railway sleepers on some Bengal railways, but the result of the experiment is not yet known. It is used in Burmah for gun-stocks, house-posts, planking, carts, furniture, and cabinet-work. It stands well under water. Weight of cubic foot of wood about 54lb. (Gamble).

Queensland and Northern Australia.

143. **Cargillia australis,** *R. Br.*, (Syn. *Maba Cargillia*, F.v.M.; *Diospyros Cargillia*, F.v.M.); N.O., Ebenaceæ, B.Fl., iv., 288. *Diospyros Cargillia* in Muell. Cens., p. 92.

The "Black Plum" of Illawarra (New South Wales), and the "Booreerra" of the aboriginals of the same district.

Wood close, very tough, and firm, of little beauty, but likely to be useful for many purposes. It is very apt to get discoloured, and to rend in seasoning (Macarthur). It makes excellent whip-handles, and other light work. This forms one of the many timbers exhibited at the London International Exhibition of 1862. Most of the original specimens are in this museum, and this is the only timber of them riddled by xylophages. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 52lb. per cubic foot, but, as already remarked, it is riddled with small holes. Diameter, 18 to 24in. Height, 60 to 80ft.

New South Wales and Queensland.

144. **Cargillia pentamera,** *F.v.M.*, (Syn. *Maba pentamera*, F.v.M.; *Diospyros pentamera*, F.v.M.); N.O., Ebenaceæ, B.Fl., iv., 288. *Diospyros pentamera* in Muell. Cens., p. 92.

The "Black Myrtle" and "Grey Plum" of Northern New South Wales, and the "Chowan" of the aboriginals of the same district.

Timber reddish, close-grained, tough, and durable; soft when fresh. It is not much used, except for tool handles occasionally, and for flooring boards. Diameter, 24 to 36in.; height, 80 to 100ft.

Northern New South Wales and Queensland.

145. **Carissa ovata,** *R.Br.*, (Syn. *C. Brownii*, F.v.M.); N.O., Apocyneæ, B.Fl., iv., 305. *C. Brownii*, F.v.M., in Muell. Cens., p. 93.

"Karey" of the aboriginals of the Rockhampton tribe (Queensland). "Ulorin" of the aboriginals of the Cleveland Bay tribe. "Kunkerberry" of the aboriginals of the Cloncurry River (Northern Queensland).

A moderately hard and heavy wood, very clear, and works well. Along the grain are a number of narrow white pithy streaks, which causes the wood, in transverse section, to have a pretty dotted appearance. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 56lb. 14oz. per cubic foot.

South Australia, New South Wales and Queensland.

146. **Carumbium populifolium,** *Reinw.*, (Syn. *C. populneum*, Muell. Arg., (and other sp.) *Omalanthus* (*Homalanthus*) *populifolius*, Grah.); N.O., Euphorbiaceæ, B.Fl., vi., 150. *Omalanthus populifolius* in Muell. Cens. p. 21.

"Queensland Poplar."

Wood soft, and of a light colour. This tree is not endemic in Australia.

Victoria, New South Wales and Queensland.

147. **Cassia Brewsteri,** *F.v.M.*, (Syn. *Carthartocarpus Brewsteri*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 282.

Wood pale-yellow, close-grained, and nicely marked. Height, up to 30 or 40ft.

New South Wales and Queensland.

148. **Cassinia aculeata,** *R.Br.*, (Syn. *C. affinis*, R.Br.; *C. adunca*, F.v.M.; *Calea aculeata*, Labill.); N.O., Compositæ, B.Fl., iii., 586.

A shrub; the wood is white and hard.

All the colonies except Western Australia and Queensland.

149. **Cassinia lævis,** *R.Br.*, (Syn. *C. rosmarinifolia*, DC.); N.O., Compositæ, B.Fl., iii., 587.

Called "Wild Rosemary" in parts of Queensland.

A rather slender shrub. The wood is dark and beautifully marked, close-grained; would be a very valuable wood cut in veneers for cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

South Australia, New South Wales and Queensland.

150. **Castanospermum australe,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 275.

"Bean Tree," or "Moreton Bay Chestnut." The "Irtalie" of the aboriginals of the Richmond and Clarence Rivers (New South Wales), and "Bogum" of others of northern New South Wales.

The timber is soft, fine-grained, and takes a good polish, but it is not durable. It is somewhat like walnut, but more pitted in appearance, and is occasionally used for cabinet-work. The beautiful dark cloudiness of the wood of young trees is lost as the trees grow older. It is sometimes split for staves. It dresses well. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 39lb. 8oz. per cubic foot.

Mr. Allen Ransome tested some specimens sent to the Colonial and Indian Exhibition. He thus reports:—"A beautifully figured, brown wood. The sample sent, being very wet, was tried under somewhat unfavourable circumstances. A baluster was turned from it, and some boards and panels planed, the work from both lathe and planing-machine being excellent. The wood should prove valuable for cabinet-makers, but should be thoroughly seasoned before being used, as it shrinks very much in drying." Diameter, 24 to 36in.; height, 80 to 90ft.

Northern New South Wales and Queensland.

151. **Casuarina spp,**

In Mr. Holtzapfel's *Turning and Mechanical Manipulation*, Casuarina timber is called "Botany Oak," and it is stated that it is shipped in round logs from 9 to 14in. in diameter. In general colour it resembles a full red mahogany, with darker red veins; the grain is more like the evergreen oak than the other European

varieties, as the veins are small, slightly curled, and closely distributed throughout the whole surface. It is used in veneer for the backs of brushes, Tunbridge-ware, and turnery; some specimens are very pretty.

Throughout the colonies.

152. **Casuarina Cunninghamiana,** *Miq.;* N.O., Casuarinæ, B.Fl., vi., 198.

From a fancied resemblance of the wood of *Casuarinas* to that of oak, these trees are called "Oaks," and the same and different species have various appellations in various parts. "Scrub She-oak." "River Oak."

Timber hard, close, and prettily marked. It is used for shingles and staves. This and other Casuarinas burn well, and their ashes retain the heat for a long while. Diameter, 24in.; height, 60 to 70ft.

New South Wales and Queensland.

153. **Casuarina distyla,** *Vent.*, (Syn., *C. stricta*, Miq., non Ait.; *C. Muelleriana*, Miq.; *C. rigida*, Miq.); N.O., Casuarineæ, B.Fl., vi., 198.

"River Oak." "Stunted She-oak."

The wood is strong, light, and tough. It is used for bullock yokes. (Hill.) In young trees the wood is white, but at a more mature age it is of a deep-red or brown colour. (J. E. Brown.) Diameter, 18 to 24in.; height, 40 to 60ft.

All the colonies except Queensland.

154. **Casuarina equisetifolia,** *Forst.*, (Syn., *C. muricata*, Roxb.); N.O., Casuarineæ, B. Fl., vi., 197.

"Swamp Oak," "Forest Oak," and "Bull Oak." Called also "Iron-wood" and "Beef-wood." Some Queensland aboriginals have bestowed upon it the name of "Wunna-wunnarumpa."

Wood coarse-grained and beautifully marked; it is used for fuel, and also for purposes where lightness and toughness are required. (Hill.) It is employed for log fencing, gates, and shingles. This tree will live in somewhat saline soil at the edge of the sea. In India it grows on pure sand, and is used as fuel for railway purposes. For this purpose plantations of it have been made near Madras. The ashes of this tree yield a quantity of

alkali, which is used in some places to produce a coarse soap. The name "Iron-wood," which it sometimes bears, is given to it on account of its colour, hardness, and durability. The natives of the South Sea Islands make clubs of it. The weight per cubic foot varies from 55lb. to 63lb., according to Gamble. Diameter, 12 to 20in.; height, 50 to 70ft.

New South Wales, Queensland and Northern Australia.

155. **Casuarina Fraseriana,** *Miq.*, (Syn. *C. torulosa*, Miq. non Ait.); N.O., Casuarineæ, B.Fl., vi., 199.

"A tall, erect shrub, or small tree." The wood easily splits into shingles. It is the best furniture wood of South-western Australia, as it does not rend. (Mueller.)

Western Australia.

156. **Casuarina glauca,** *Sieb.*, (Syn. *C. torulosa*, Miq. non Ait.); N.O., Casuarineæ, B.Fl., vi., 196.

"River She-oak." "Bull-oak." "Desert She-oak." "Swamp-oak," and "Belah" or "Billa." "Ngaree" of the aboriginals of Lake Hindmarsh Station (Victoria).

The timber is strong and tough, and is used for staves, shingles, etc.; also for rails, but not for posts. It is of a red colour, beautifully marked, close in the grain, but very brittle. It might be useful for cabinet-work. Diameter, 12 to 24in; height, 40 to 50ft.

All the colonies except Tasmania and Western Australia.

157. **Casuarina inophloia,** *F.v.M. et Bail.*, Muell. Cens., p. 23. N.O., Casuarineæ.

Wood very beautiful, of a reddish colour, but with numerous dark marks, the grain close; a very desirable wood for cabinet-work (*Cat. Queensland Woods, Col. and Ind. Exh., 1886*).

New South Wales and Queensland.

158. **Casuarina stricta,** *Ait. non Miq.*, (Syn. *C. quadrivalvis*, Labill.; *C. macrocarpa*, A. Cunn; *C. cristata*, Miq.; *C. Gunnii*, Hook, f.); N.O., Casuarineæ, B.Fl., vi., 195. *C. quadrivalvis* in Muell. Cens. p. 22.

"Shingle-oak," Coast She-oak," "River-oak," "Salt-water Swamp-oak." The "Worgnal" of the aboriginals of the Richmond and Clarence Rivers (New South Wales).

Wood close, but not durable. (Hill.) It is tough, and yields 27 per cent. of charcoal, 43 per cent. of crude wood-vinegar, and 7 per cent. of tar. The wood is of a reddish colour, and has dark bands running through it, chiefly in a longitudinal direction, which gives to the polished wood a fine mottled appearance, rendering it very suitable for the manufacture of furniture. It is also used in turnery, and for such articles as bullock-yokes, wheel-spokes, axe-handles, staves, shingles, etc. As fuel, it can hardly be excelled. (Mueller and J. E. Brown.) The appearance of this handsome wood is very difficult to describe, its heart-wood is darker and less handsome than the other portions. It works up splendidly. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 56lb. 14oz., and 63lb. per cubic foot respectively. In the *Report Intercol. Exh.*, 1861, the specific gravity of this wood is given as 1.037 (equivalent to 65lb. per cubic foot), while the specific gravity of the wood of *C. cristata* (included under this species), is given at .935 and .965 (58½ to 60½lb. per cubic foot). The lighter (of the Museum samples) wood is also the lightest in colour of any Casuarina timber the author has seen. It is so light, and has so little figure that a second glance is necessary to be quite sure that it is Casuarina wood at all. Sir William Macarthur, who collected this variety, calls it "Salt-water Swamp-oak," and says of it: "Tall growing, found only near the margin of salt-water." Wood not much valued. Diameter, 9 to 15in.; height, 20 to 30ft.

All the colonies except Western Australia and Queensland.

159. **Casuarina suberosa,** *Otto et Dietr.*, (Syn. *C. leptoclada*, Miq.; *C. mæsta*, F.v.M.); N.O., Casuarineæ, B.Fl., vi., 197.

On this tree a number of appellations have been bestowed, viz.:—"Erect She-oak," "Forest-oak," "Swamp-oak," "Shingle-oak," "River Black-oak," and "Beef-wood." Formerly called "Wayetuck" by the Yarra aboriginals.

Timber used for bullock yokes, mauls, tool handles, shingles, etc. It is of great beauty for cabinet-work, but very apt to rend in drying; it should be used only in veneers. (Macarthur.) The Yarra (Victoria) blacks used to make boomerangs of this wood. A ton of dry wood yields about 7¼lb. of pearl-ash, or 4½lb. of pure potash. (Mueller.) A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 59lb. 11oz. per cubic foot. Diameter, 24in.; height, 40 to 50ft.

All the colonies except Western Australia.

160. **Casuarina torulosa,** *Ait.*, (Syn. *C. tenuissima*, Sieb.); N.O., Casuarineæ, B.Fl., vi., 200.

"Forest-oak." "River-oak." Called "Mountain-oak" in Queensland. "Beef-wood." The "Noo-loi" of the aboriginals of Northern New South Wales, and the "Koondeeba" of those of Southern Queensland. "Bureutha" of some Central Queensland aboriginals.

Much used for fuel. The wood is close, and prettily marked, yielding handsome veneers. This handsome wood has a marking peculiarly its own. The line of demarcation of the heart-wood is well-defined. It is used for cabinet-work, and produces very superior shingles. It is one of the best woods for oven fuel. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862, as *C. tenuissima*), has a weight which corresponds to 64lb. per cubic foot. Diameter, 18 to 24in.; height, 60 to 80ft.

New South Wales and Queensland.

161. **Cedrela Toona,** *Roxb.*, (Syn. *C. australis*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 387. *C. australis* in Muell. Cens., p. 9.

The "Cedar," or "Red Cedar" (a universal appellation in Australia). Called "Polai" by the aboriginals of Northern New South Wales, "Mumin," or "Mugurpul" by those about Brisbane, and "Woota" by those about Wide Bay (Queensland). The "Toon" Tree (of India).

This timber is light, very durable, easily worked, and is largely employed in house joinery and furniture making; in fact

wherever lightness and durability are required. Its use, especially in New South Wales and Queensland, is so well known that it is unnecessary to dilate upon it. The junctions of the large branches with the stem furnish those beautiful curled pieces of which the finest veneers are made. Speaking of this wood the Jurors of the London International Exhibition of 1862 reported:—"A sideboard top made of veneers of root-pieces of this timber is of astonishing and perfect beauty, and resembles a rich marble." A slab in the Technological Museum, about two feet square and two inches thick, cut from near the root, is of great beauty. It has a beautiful vertical marking, and branching from this, on either side, are beautiful parallel markings. A piece eight feet across, cut from near a fork, is of still greater beauty.

The following is taken from Gamble's *Manual of Indian Timbers*, speaking of *C. Toona*: "Weight of cubic foot about 35lb. The wood is durable, and not eaten by white ants; it is highly valued, and universally used for furniture of all kinds, and is also employed for door panels and carving. From Burmah it is exported under the name of 'Moulmein Cedar,' and as such is known in the English market. In North West India it is used for furniture, carvings, and other purposes. In Bengal and Assam it is the chief wood for making tea boxes, but it is getting scarce, on account of the heavy demand. The Bhutias use it for shingles and for wood-carving; they also hollow it out for rice-pounders. It is, or rather used to be, for very large trees are now rather scarce, hollowed out for canoes in Bengal and Assam." It is one of the "Chittagong woods" of commerce.

Mr. Allen Ramsome thus reports on a Queensland specimen sent to the Colonial and Indian Exhibition: "This resembles the wood last mentioned *(Dysoxylon Fraserianum)*, but is somewhat inferior. It is softer and lighter, and considerably coarser in grain. It planes and works very well, however, and would do for common cabinet-work. It is already known in the English market as 'Moulmein Cedar.'" Mr. Ramsome could not have been given an average piece of cedar, but a very inferior one (and the finest timber in the world has some of inferior quality belonging to the same species), or he could not have written so lukewarm, or even

disparaging, a report on what the most disinterested person in the colonies knows to be a timber of the highest class.

Campbell *(Proc. R.S., Vict.,* 1879) gives 2000lb. to 3000lb. per square inch as the tensile strength of this timber. Diameter, 36 to 78in.; height, 150 to 180ft.

New South Wales and Queensland.

CEDAR EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Sample in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflections at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.
New South Wales.	Seasoned at least 12 months.	28/1/84	5¼	5.42	31.71	0.508	0.508	4.3.9	495.6	495.6	4⅝	4.54	4.54	1353
		7/2/84	5					4.1.4			4½			
		7/2/84	6					4.0.18			4½			

162. **Celastrus bilocularis,** *F.v.M.;* N.O., Celastrineæ, B.Fl., i., 399.

Wood of a light-grey colour, close in the grain, hard, and tough.

New South Wales and Queensland.

163. **Celastrus Cunninghamii,** *F.v.M.,*(Syn., *Catha Cunninghamii, Hook.)*; N.O., Celastrineæ, B.Fl., i., 399.

The wood is close-grained, easily worked, and likely to be serviceable for turning and cabinet-work. (Hill.) It is of a pinkish colour, nicely marked, and useful for cutting into veneers. Diameter, 12 to 16in.; height, 20 to 30ft.

New South Wales, Queensland and Northern Australia.

164. **Celastrus dispermus,** *F.v.M.*, N.O., Celastrineæ, B.Fl., i., 399.

Wood close-grained, and capable of a fine polish. (Hill.) Diameter, 3 to 5in.; height, 12 to 16ft.

Queensland.

165. **Celtis paniculata,** *Planch.*, (Syn. *C. ingens*, F.v.M.; *Solenostigma paniculatum*, Endl.; *S. brevinerve*, Blume.); N.O., Urticeæ, B.Fl., vi., 156.

Wood white, soft, and pliable; used for hoops for casks. (Hill.) This species is not endemic in Australia. Diameter, 6 to 12in.; height, 25 to 35ft. *C. australis*, the "Nettle Tree" of Europe, yields a highly-prized wood. It is used for furniture and carving, and the branches are extensively employed in making hay-forks, coach-whips, ramrods and walking-sticks. It is also used for flutes.

New South Wales, Queensland and Northern Australia.

166. **Celtis philippinensis,** *Blanco*, (Syn. *C. strychnioides*, Planch.); N.O., Urticeæ, B.Fl., vi., 156.

"A tall shrub or stunted tree." Wood light-coloured, hard, and close-grained. This species is not endemic in Australia.

Queensland and Northern Australia.

167. **Ceratopetalum apetalum,** *D. Don*, N.O., Saxifrageæ, B.Fl., ii., 442.

"Lightwood," "Coachwood," or "Leather-jacket." Formerly called "Boola" by the aboriginals of Illawarra, and "Ngnaa-rewing" by those of Brisbane Water.

Wood light, exceedingly tough, good for joiners' and cabinet-work, and in much request for boat and coach building, tool handles, etc. It possesses an agreeable fragrance. It is said to be peculiarly well adapted for sounding boards for musical instruments, stethoscopes, and similar purposes. It has no figure to speak of. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at

193. **Cryptocarya Murrayi,** *F.v.M.*, N.O., Laurineæ, B.Fl., v., 295.

A large tree; wood of a dark colour, hard, and close-grained. Queensland.

194. **Cryptocarya obovata,** *R.Br.*, (Syn. *C. hypospodia*, F.v.M.); N.O., Laurineæ, B.Fl., v., 296.

"Sycamore," "White Sycamore," "Bastard Sycamore," "She-beech," "Flindosa," "Myndee."

This tree produces a soft, whitish, and useful wood, useful for cabinet-work; it turns darker with age. It is fairly durable when not exposed to the influence of the weather. It may undoubtedly be called a good wood; it works admirably. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 34lb. 15oz. per cubic foot. Diameter, 24in.; height, 70 to 80ft.

New South Wales and Queensland.

195. **Cryptocarya triplinervis,** *R.Br.*, (Syn. *Caryodaphne Browniana*, Nees); N.O., Laurineæ, B.Fl., v., 297.

A tall tree; wood of a grey colour, close in the grain, and tough.

New South Wales and Queensland.

196. **Cudrania javanensis,** *Tréc.*, (Syn. *Morus calcar-galli*, A. Cunn.; *Maclura javanica*, Miq.); N.O., Urticeæ, B.Fl., vi., 179.

"Cockspur Thorn." "Fustic."

A shrub or small tree; wood dark yellow, and close-grained; a desirable cabinet wood.

New South Wales and Queensland.

197. **Cupania anacardioides,** *A. Rich.*, N.O., Sapindaceæ, B.Fl., i., 458.

"Brush Deal" and "Tuckeroo" are Queensland colonial and aboriginal names respectively.

A slender tree; the timber is occasionally used for house building purposes, but it is not generally valued. (Moore.) It is

of a light pinkish colour, close-grained, and tough. It dresses well, and is not an ill-looking timber, but it cannot be called handsome. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. per cubic foot.

New South Wales, Queensland and Northern Australia.

198. **Cupania nervosa,** *F.v.M.*, N.O., Sapindaceæ, B.Fl., i., 459. United with *C. xylocarpa* as a var. in Muell. Cens.

"A moderate-sized tree." Wood of a light colour, but the centre dark ; the grain close.

New South Wales and Queensland.

199. **Cupania pseudorhus,** *A. Rich.*, N.O., Sapindaceæ, B.Fl., i., 459.

"Iccaaya" and "Bunderoo" are aboriginal names on the Richmond and Clarence Rivers (New South Wales).

Wood fine-grained, of a light pinkish-brown colour, and very tough. It would be excellent for pick handles. It shrinks somewhat, but does not appear to split and crack. It is of very even texture. A wood-borer commenced boring into this slab, but although it was left undisturbed, it abandoned the enterprise after making a small and very shallow groove. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 43lb. 14oz. per cubic foot. Diameter, 14 to 20in. ; height, 30 to 40ft.

New South Wales and Queensland.

200. **Cupania semiglauca,** *F.v.M.*, (Syn., *Nephelium semiglaucum*, F.v.M. ; *Arytera semiglauca*, F.v.M.) ; N.O., Sapindaceæ, B.Fl., i., 457. Muell., Fragm., iv., 158.

"White Bark." "Black Ash." "Wild Quince." "Tyal-dyal" of the aboriginals of Northern New South Wales.

The wood soft, and, as yet, of no recognised value. (Hill.) Another authority, however, speaks of it as tough, close-grained,

and elastic. It is white, and nicely veined by numerous wavy lines radiating from the centre. Diameter, 12 to 15in.; height, 50 to 60ft.

New South Wales and Queensland.

201. **Cupania serrata,** *F.v.M.*, N.O., Sapindaceæ, B.Fl., i., 458.

A rather light, clear-working wood, which polishes well, and reminds one very much of beech, but it is much more porous than that wood. It does not work well on the end-grain. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 36lb. 8oz. per cubic foot.

New South Wales and Queensland.

202. **Cupania xylocarpa,** *A. Cunn.*, N.O., Sapindaceæ, B.Fl., i., 459.

Called "Marsh Hickory" in Queensland, and "Wootorie" by the aboriginals of the Richmond and Clarence Rivers (New South Wales).

Timber close-grained, and hard, particularly so when dry. (Moore.) It is tough, and of a light-yellow colour, the grain resembling lance-wood; it would be useful for making tool handles. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) The samples under my charge are of the ordinary pinky-brown colour, peculiar to *Cupania* timber. It is apparently a useful wood for ordinary purposes, but seems to have nothing specially to recommend it. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 42lb. 1oz. per cubic foot. Diameter, 12 to 24in.; height, 40 to 50ft.

New South Wales and Queensland.

203. **Cuttsia viburnea,** *F.v.M.*, N.O., Saxifrageæ, Muell. Cens., p. 48.

Wood white, close in the grain, and very tough. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

204. **Cycas media,** *R.Br.*, N.O., Cycadeæ, B.Fl., vi., 249.

Wood or outer part stringy; the centre of the stem spongy. Of no use for timber purposes, but perhaps it might be useful to a limited extent for rustic-work. Height, from 10 to 20ft.

Queensland and Northern Australia.

205. **Cynometra ramiflora,** *Linn.*, (Syn. *C. bijuga*, Span.); N.O., Leguminosæ, B.Fl., ii., 296.

Gamble says that this timber is used in India for native huts and for fuel. Its weight is 56lb. per cubic foot.

Queensland.

206. **Dacrydium Franklini,** *Hook f.*, (Syn. *D. Huonense*, A. Cunn.); N.O., Coniferæ, B.Fl., vi., 245.

"Huon Pine," or "Macquarie Pine."

This wood is light and tough. Whaleboats are built of it. For boat-building it is peculiarly adapted, and it is also used for house-fittings. In the New Zealand Exhibition of 1865 there was shown a board of this timber which had been forty-five years in the same building, and was yet thoroughly sound. The old timber is so hard and durable that the fallen trees lie in the damp forests for many years without rotting. "The aroma is said to keep off insects. The beautiful marking of the butt, roots, etc., is peculiar, and quite unrivalled for pale cabinet-work." (*Jurors' Reports, London International Exhibition*, 1862.) This invaluable wood has been so much appreciated that it is now quite scarce, and is, consequently, very expensive. Usually 60 to 80ft. high, but sometimes 100ft.

Tasmania.

207. **Dalbergia densa,** *Benth.*, N.O., Leguminosæ, B.Fl., ii., 271.

A small tree; wood of a light colour, and close grain.

Queensland.

208. **Dammara robusta,** *F.v.M.*, (Syn. *D. Brownii*, (garden name); *Agathis robusta*, Salisb.); N.O., Coniferæ, B.Fl., vi., 244.

"Queensland Kauri," or "Dundathu Pine."

Wood of a light yellow colour, close-grained, soft, and easy to work; largely used by joiners and cabinet-makers. Diameter, 36 to 72in.; height, 80 to 130ft.

Queensland.

209. **Daphnandra aromatica,** *Bail.*, N.O., Monimiaceæ, Supp. Queensland Flora. (Bailey.)

Wood of a light colour, not unlike deal, for which it would form a substitute. (Bailey.)

Johnston River, Queensland.

210. **Daphnandra micrantha,** *Benth.*, (Syn. *Atherosperma micrantha*, Tul.); N.O., Monimiaceæ, B.Fl., i., 285.

"Sassafras," "Light-yellow Wood," "Satin-wood."

The wood of this tree-climber is soft and weak, and of little value except for packing cases. (Hill.) It is quite yellow when fresh, takes a fine polish, but it becomes dirty-looking with age, and is rarely pretty. It is fragrant, and might perhaps be suitable for cabinet-work, such as the making of cabinet drawers, shelves, etc. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 43lb. 8oz. per cubic foot. Diameter, 18 to 24in.; height, 50 to 80ft.

New South Wales and Queensland.

211. **Daphnandra repandula,** *F.v.M.*, N.O., Monimiaceæ, Muell. Cens., p. 3.

Wood of a light colour, nicely figured, grain close; probably it might serve for engraving. It closely resembles English holly. (*Cat. Queensland Woods Col. and Ind. Exh.*, 1886.)

Queensland.

212. **Darlingia spectatissima,** *F.v.M.*, (Syn. *Helicia Darlingiana*, F.v.M.; *Knightia Darlingii*, F.v.M.); N.O., Proteaceæ, B.Fl., v., 533.

Wood of a light brown colour, nicely marked, light, and firm; a useful wood for both cooper and cabinet-maker. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Northern Queensland.

213. **Davidsonia pruriens,** *F.v.M.*, N.O., Leguminosæ, Muell., Cens., p. 48.

Wood dark-coloured, close-grained, hard, and tough.

Queensland.

214. **Daviesia arborea,** *W. Hill*, N.O., Leguminosæ, Cat. Queensland Timbers, S.I.E., (1879).

"Queen-wood."

This wood is hard, close-grained, with beautiful pink streaked lines, and takes a beautiful polish. It is destined to take a prominent position with cabinet-makers. (*Cat. of Queensland Timbers*, p. 65, No. 141, *Sydney International Exhibition*, 1879.) In the absence of a botanical description of Hill's species, I am unable to say whether it is identical with *D. aborea*, F.v.M. et Scortech., in the *Proc. Linn. Soc., N.S.W.*, vii., 221 (1882). Diameter, 6 to 12in.; height, 15 to 30ft.

New South Wales and Queensland.

215. **Denhamia obscura,** *Meissn.*, (Syn. *D. xanthosperma*, F.v.M.; *D. heterophylla*, F.v.M.; *Leucocarpon obscurum*, A. Rich.); N.O., Celastrineæ, B.Fl., i., 401. *Leucocarpon obscurum* in Muell. Cens., p. 26.

Wood fine-grained and tough. Diameter, 3 to 4in.; height, 12 to 15ft.

Queensland and Northern Australia.

216. **Denhamia pittosporoides,** *F.v.M.*, (Syn. *Leucocarpon pittosporoides*, F.v.M.); N.O., Celastrineæ, B.Fl., i., 402. *Leucocarpon pittosporoides* in Muell. Cens., p. 26.

The timber is hard, fine-grained, and takes a good polish. (Hill.) It is of a uniform pale-yellow colour, resembling English

elder, and suitable for engraving, pattern-making, and similar uses. Diameter, 6 to 8in.; height, 20 to 30ft.

Northern New South Wales and Queensland.

217. **Derris uliginosa**, *Benth.*, (Syn. *Pongamia uliginosa*, DC.); N.O., Leguminosæ, B.Fl., ii., 272.

The stems of this scandent shrub are used for tying logs to boats in parts of India. (Gamble.)

Queensland and Northern Australia.

218. **Dicksonia Youngiæ**, *C. Moore*, N.O., Filices, B.Fl., vii., 713.

Wood, or outer part of the stem, black, streaked with white, the dark very hard. This description applies more or less to the trunks of other tree-ferns. Diameter, 4in.; height, 10 to 12ft.

New South Wales and Queensland.

219. **Diospyros hebecarpa**, *A. Cunn.*, N.O., Ebenaceæ, B.Fl., iv., 286.

Timber soft and elastic; used for pick handles, etc. It is of a yellow colour, with numerous small black spots. Diameter, 12 to 18in.; height, 30 to 50ft.

Queensland and Northern Australia.

220. **Diplanthera tetraphylla**, *R.Br.*, (Syn. *Bulweria nobilissima*, F.v.M.; *Tecomella Bulweri*, F.v.M.; *Deplanchea Bulwerii*, F.v.M.); N.O., Bignoniaceæ, B.Fl., iv., 540.

"A moderate-sized, or sometimes lofty tree." Wood of a whitish colour, close-grained, and firm. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland.

221. **Diploglottis Cunninghamii**, *Hook. f.*, (Syn. *Cupania australis*, Hook. f.; *C. Cunninghamii*, Hook. f.; *Stadmannia australis*, Don.); N.O., Sapindaceæ, B.Fl., i., 453.

"Tamarind-tree," "Burrunedura" of the aboriginals of Illawarra, and "Acouloby" and "Toonoum" of those of Northern New South Wales.

Wood white, close-grained, and firm. (Hill.) "It appears that if properly cut it would yield an excellent figure for cabinet-work." (*Jurors' Reports, London International Exhibition, 1862.*) This description may be supplemented by saying that its usual colour is something between drab and flesh colour; it has a pretty wavy end-grain; it dresses excellently on the face, but not on the end-grain. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which corresponds to 38lb. 9oz. and 50lb. 8oz. per cubic foot. These determinations have been carefully made, and the author has no reason to suppose that the woods are mis-named. No date as to the respective ages of the trees, or as to the parts of the tree whence the slabs were taken, are in my possession. Diameter, 12 to 24in.; height, 50 to 100ft.

New South Wales and Queensland.

222. **Dissiliaria baloghioides,** *F.v.M.*, N.O., Euphorbiaceæ, B.Fl., vi., 90.

"Teak." The "Currungul" of the aboriginals.

Timber hard, close-grained, and durable; brown in colour, becoming darker towards the centre; might be useful for any purpose to which the English apple is put, and which the wood is thought to resemble. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Diameter, 18 to 30in.; height, 40 to 60ft.

Queensland.

223. **Dodonæa attenuata,** *A. Cunn.*, (Syn. *D. Preissiana*, Miq.); N.O., Sapindaceæ, B.Fl., i., 477. Incl. under *D. viscosa* in Muell., Cens., p. 25.

Specific gravity of the wood, 1.022. (*Report, Victorian Exhibition*, 1861.)

All the colonies.

224. **Dodonæa triquetra,** *Andr.*, (Syn. *D. laurina*, Sieb.; *D. longipes*, G. Don); N.O., Sapindaceæ, B.Fl., i., 474.

"Hop Bush" (the name for all species of *Dodonæa*). "Kinjenga-kilamul" of some Queensland aboriginals, and "Wallam-bunnang" by some near Camden.

Dodonæas are shrubs. Wood of a light colour, except near the centre; close-grained.

Victoria, New South Wales and Queensland.

225. **Dodonæa viscosa,** *Linn.*, (Syn. *D. dioica*, Roxb.; *D. angustifolia*, Linn. f.); N.O., Sapindaceæ, B.Fl., i., 475.

"*Watchupga*" *of the aboriginals at Lake Hindmarsh Station (Victoria).* The "Switch-Sorrel" of Jamaica.

Wood of a brown colour, close-grained, and hard. It is used in India for engraving, turning, tool handles, and walking-sticks, and the branches to support the earth of flat roofs. (Gamble.)

All the colonies.

226. **Dodonæa viscosa,** *Benth*, var. **spathulata,** (Syn. *D. viscosa*, var. *asplenifolia*, Hook f.; *D. spathulata*, Smith; *D. conferta*, G. Don); N.O., Sapindaceæ, B.Fl., i., 476.

This wood is exceedingly dense, close-grained, and durable, of a very flinty nature, so much so that the edge of a well-tempered axe is often broken when it comes in contact with this tree. The heart-wood is greenish-black, streaked with rose. It is fit for sheaves of ships' blocks, rulers, treenails, turnery, inlaid work, and for many other purposes. (Guilfoyle.)

South Australia, Tasmania, Victoria and New South Wales.

227. **Doryphora sassafras,** *Endl.*, N.O., Monimiaceæ, B.Fl., v., 283.

"Sassafras." The following are, or were, some of its New South Wales aboriginal names:—"Caalang," Illawarra; "Tdjeundegong," Brisbane Water; "Boobin," northern districts.

The timber is fragrant, and disagreeable to all kinds of vermin; it is soft and weak, yet suitable for the inside lining of houses, for some kinds of furniture, etc. It is also used for packing-cases. It is light in weight, and light coloured, and sometimes presents a neat figure, but the author does not think it can be durable. Diameter, 2 to 3ft.; height, over 50ft.

New South Wales and Queensland.

228. **Dracæna angustifolia,** *Roxb.*, (Syn. *D. reflexa*, F.v.M.; *Cordyline Rumphii*, F.v.M.); N.O., Liliaceæ, B.Fl., vii., 20.

Wood, or the outer hard portions of the stem, of a light colour, the rest very soft and spongy. Height, 6 to 12ft.

Queensland and Northern Australia.

229. **Duboisia myoporoides,** *R.Br.*, (Syn. *Notelæa ligustrina*, Sieb.); N.O., Scrophularineæ (in Muell. Cens., referred to Solaneæ); B.Fl., iv., 474.

"Corkwood." "Elm." "Onungunabie" is the name by which it is known to the aboriginals of the Clarence River (New South Wales). "Ngmoo" is another aboriginal name.

Timber white or yellowish, soft, close-grained, and firm, though succulent in a green state. It is used for carving and wood-engraving. Its bark resembles that of the Cork Oak. The late Mr. Macpherson, teacher of wood-carving in the Technical College, Sydney, informed the author that he was using large quantities of this wood, and was much pleased with it. On the face-grain it gives a clean surface with facility, but it is very difficult to work on the end-grain. It has no figure to speak of. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 30lb. and 30lb. 12oz. respectively per cubic foot. Diameter, 12 to 24in.; height, 20 to 25ft.

New South Wales and Queensland.

230. **Dysoxylon Fraserianum,** *Benth.*, (Syn. *Hartighsea Fraseriana*, A. Juss.); N.O., Meliaceæ, B.Fl., i., 381. *Dysoxylum* in Muell. Cens.

Called variously "Rosewood," "Pencil Cedar," and "Bog-onion." It is called "Bullerum" by the aboriginals of Northern New South Wales.

Timber fragrant, and much valued for indoor work, furniture, cabinet-work, turning, wood engraving, and ship-building.

Speaking of a Queensland specimen sent to the Colonial and Indian Exhibition, Mr. Allen Ransome says: "This wood is of a reddish colour, with a good figure. It worked excellently in

the machines, and planes especially well. If it can be imported at a reasonable price it might take the place of mahogany." Diameter, 36 to 48in.; height, 50 to 70ft.

Northern New South Wales and Queensland.

231. **Dysoxylon Muelleri,** *Benth.*, N.O., Meliaceæ, B.Fl., i., 381.

"Pencil Cedar," or "Turnip-wood." The "Kidgi-kidgi," or "Kedgy-kedgy," of the aboriginals of Northern New South Wales.

Timber of a rich red colour; used for cabinet-making and window work. When fresh cut the wood has much the smell of a Swedish turnip. It easily splits, and is undoubtedly a most valuable wood, though the statement that it is equal to Spanish mahogany is probably an exaggeration. Diameter, 20 to 40in.; height, 70 to 80ft.

Northern New South Wales and Queensland.

232. **Dysoxylon oppositifolium,** *F.v.M.*, N.O., Meliaceæ. Muell. Cens., p. 9.

Wood with a small prettily-marked heart-wood, and a large quantity of yellow wood towards the bark; grain close, easily worked, and fragrant; a useful wood for both joiner and cabinet-maker.

Queensland.

233. **Dysoxylon rufum,** *Benth.*, (Syn. *Hartighsea rufa*, A. Rich.); N.O., Meliaceæ, B.Fl., i., 382.

"Bastard Pencil Cedar."

The wood is nicely grained, and used for various purposes, but principally for cabinet-work. (Hill.) Diameter, 18 to 24in.; height, 40 to 50ft.

Northern New South Wales and Queensland.

234. **Echinocarpus australis,** *Benth.*, (Syn. *Sloanea australis*, F.v.M.); N.O., Liliaceæ, B.Fl., i., 279. *Sloanea australis* in Muell. Cens., p. 17.

"Maiden's Blush." The "Kerabin," or "Yaarum," of the Northern New South Wales aboriginals.

Timber soft and durable; fine pieces may be used for cabinet and ornamental purposes. It is of a delicate rosy colour when

freshly cut, but this soon fades into light yellowish brown. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 39lb. per cubic foot. Diameter, 2 to 4ft.; height, 80 to 100ft.

New South Wales and Queensland.

235. **Ehretia acuminata,** *R.Br.*, N.O., Boragineæ, B.Fl., iv., 387.

"Brown Cedar."

Wood light brown, grain coarse, firm, easy to work; closely resembling English Elm. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Height, 20 to 30ft.

Victoria, New South Wales and Queensland.

236. **Elæagnus latifolia,** *Linn.*, (Syn. *E. conferta*, Roxb.; *E. ferruginea*, A. Rich.); N.O., Eleæagneæ, Muell. Cens., p., 64.

Speaking of an Indian-grown specimen, Gamble says: "The weight of this wood is 45lb. per cubic foot."

Queensland.

237. **Elæocarpus Bancroftii,** *F.v.M. et Bail.*, N.O., Tiliaceæ. *Proc. R.S., Queensland*, 1885.

Wood hard and durable, light, with a darker colour in the centre; likely to prove useful for sheaves for blocks. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) It considerably resembles the American *lignum vitæ*, for which, indeed, it might form a good substitute. (Mueller.) Diameter, over 2ft.; height, over 100ft.

Queensland.

238. **Elæocarpus cyaneus,** *Ait.*, (Syn. *E. reticulatus*, Smith); N.O., Tiliaceæ, B.Fl., i., 281.

"Native Olive." "White Boree." "White Bark." "Blueberry Ash," in Southern New South Wales.

This wood is dark-coloured inside, with white sap-wood, and very tough. It makes good handles and poles. (*General Report, Sydney International Exhibition*, 1879.) It is suggested as a

wood for engraving, and by some it has been likened to English Ash. Diameter, 12 to 15in.; height, 40 to 50ft.

Tasmania, Victoria, New South Wales and Queensland.

239. **Elæocarpus grandis,** *F.v.M.*, N.O., Tiliaceæ, B.Fl., i., 281.

"Blue Fig" and "Brisbane Quandong" of the colonists. "Callhum," "Calhun," or "Cullangun" of the Queensland aboriginals.

The wood is soft, and easily worked. It is likely to be serviceable for brakes for railway carriages. (Hill.) Diameter, 24 to 36in.; height, 90 to 100ft.

New South Wales and Queensland.

240. **Elæocarpus holopetalus,** *F.v.M.*, N.O., Tiliaceæ, B.Fl., i., 281.

"Blueberry Ash." "Prickly Fig." Called "Madda-gowrie" in the Bombala district of New South Wales, owing to its supposed resemblance to a New Zealand tree bearing that name.

This wood is white, close-grained, and good for joiners' work. (Macarthur.) Baron Mueller speaks of it as "exquisite for cabinet-work." A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 37lb. 7oz. per cubic foot. Diameter, 12 to 24in.; height, 60 to 80ft.

Victoria and New South Wales.

241. **Elæocarpus Kirtoni,** *F.v.M. inedit.*, N.O., Tiliaceæ; Supp. Syn. Queensland Fl. (Bailey).

"White Beech." *E. reticulata*, var. *Kirtoni*, is known as "Illawarra Ash," or "Mountain Ash."

Wood light-brown, fine-grained, and suitable for furniture. It somewhat resembles English Sycamore. A specimen of timber from Southern New South Wales in the Technological Museum has been pronounced by Baron Mueller to be *E. reticulata*, var. *Kirtoni* (? = *E. Kirtoni*). It is said to get very hard after drying, but will not stand for outside work; locally it is being used for flooring-boards, and it is being tried for butter-kegs.

New South Wales and Queensland.

242. **Elæocarpus longifolia,** *C. Moore, ined.*, N.O., Tiliaceæ.

"Mountain Ash" of Illawarra, the "Miltary-miltary" of Northern New South Wales.

This wood is close-grained, elastic, and easily worked; it is used by wheelwrights, and for oars. (*General Report, Sydney International Exhibition*). It has a white sap-wood and a brown heart.

New South Wales.

243. **Elæocarpus obovatus,** *G. Don.*, (Syn. *E. parviflorus*, A. Rich.; *E. pauciflorus*, Walp.); N.O., Tiliaceæ, B.Fl., i., 281.

"Ash" (Ash Island, Hunter River, New South Wales, owes its name to this tree), "Pigeon-berry Ash," "Chereen" of the aboriginals of Northern New South Wales, and "Woolal" of those of Queensland.

This wood is white, hard, tough, and used for oars, etc. It is firm, and easy to work. Diameter, 24 to 30in.; height, 80 to 90ft.

New South Wales, Queensland and Northern Australia.

244. **Elæodendron australe,** *Vent.*, (Syn. *Portenschlagia australis*, Tratt.); N.O., Celastrineæ, B.Fl., i., 402.

"White Cedar." "Blue Ash." "Couraivo" is an aboriginal name.

Timber close-grained, pinkish, and prettily marked, but it is apt to split in seasoning. It is very valuable for staves, oars, and shingles. (*General Report, Sydney International Exhibition*, 1879.) A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 49lb. 8oz. per cubic foot. Diameter, 4 to 12in.; height, 20 to 30ft.

New South Wales, Queensland and Northern Australia.

245. **Elæodendron melanocarpum,** *F.v.M.*, N.O., Celastrineæ, B.Fl., i., 403.

"Korawal" of some Queensland aboriginals.

Wood tough, of a light colour, and fine grain. Diameter, 4 to 10in.; height, 40 to 60ft.

Queensland and Northern Australia.

246. **Emmenospermum alphitonioides,** *F.v.M.*, N.O., Rhamneæ, B.Fl., i., 415.

"Dogwood," or "Mountain Ash."

Timber durable and straight-grained; excellent for staves, oars, wheelwrights' work, tool handles, and for boat-building; also esteemed for general building purposes. Diameter, 24 to 30in.; height, 130 to 170ft.

New South Wales and Queensland.

247. **Endiandra glauca,** *R.Br.*, N.O., Laurineæ, B.Fl., v., 300.

"Teak." "Murrogun" of the aboriginals of Brisbane Water, near Sydney.

The wood is hard, close, and fine in grain, the duramen dark coloured, and frequently very handsome, with a powerful aromatic fragrance throughout when fresh. It is said to be a very valuable timber. (Macarthur.) It is used to a limited extent for cabinet and ornamental purposes. Diameter, 18 to 24in.; height, 70 to 80ft.

Queensland and New South Wales.

248. **Endiandra Sieberi,** *Nees*, N.O., Laurineæ, B.Fl., v., 301.

"Corkwood." "Till" of the aboriginals.

Timber light brown, soft, and easily worked; suitable for cabinet-work and tool handles. Diameter, 18 to 24in.; height, 80 to 90ft.

New South Wales and Queensland.

249. **Endiandra virens,** *F.v.M.*, N.O., Laurineæ, B.Fl., v., 302.

A tall shrub or tree, attaining a considerable height. Wood of a grey colour, close-grained, and firm; useful for many purposes.

Northern New South Wales and Queensland.

250. **Entada scandens,** *Benth.*, (Syn. *E. Pursætha*, DC.; *Mimosa scandens*, Linn.); N.O., Leguminosæ, B.Fl., ii., 298. *E. Pursætha* in Muell. Cens., p. 43.

"Queensland Bean."

This climbing plant is a native of the tropics of both hemispheres, and the pods often measure six or eight feet in length.

The seeds are about two inches across, by half-an-inch thick, and have a hard woody and beautifully polished shell, of a dark brown or purplish colour. These seeds are converted into snuff-boxes, scent-bottles, spoons, etc., and in the Indian bazaars they are used as weights. (*Treasury of Botany.*) In the colonies we usually see the beans of this plant mounted with silver, as match-boxes. The wood itself is soft, fibrous, and spongy.

Queensland.

251. **Eremophila bignoniæflora,** *F.v.M.*, (Syn. *Stenochilus bignoniæflorus*, Benth.); N.O., Myoporinæ, B.Fl., v., 25.

"Pombel" of some Queensland aboriginals.

Wood fragrant, and most elegantly marked with green and yellowish figures; it takes a high polish. (Thozet.) It is close-grained and hard, with a pretty green and yellowish figure. If well cut it would produce a good bold figure. (*Jurors' Reports, London International Exhibition,* 1862.) Diameter, 6 to 12in.; height, 20 to 30ft.

All the colonies except Tasmania and Western Australia.

252. **Eremophila longifolia,** *F.v.M.*, (Syn. *Stenochilus longifolius,* R.Br.; *S. salicinus*, Benth.; *S. pubiflorus*, Benth.); N.O., Myoporineæ, B.Fl., v., 23.

"Emu Bush." "Berrigan" of aboriginals of the interior of New South Wales.

The timber is brittle, and not used. "Specific gravity, .925." (*Report, Victorian Exhibition,* 1861.) Diameter, 4 to 8in.; height, 10 to 15ft.

All the colonies except Tasmania.

253. **Eremophila Mitchelli,** *Benth.*, N.O., Myoporineæ, B.Fl., v., 21.

"Sandal-wood" or "Bastard Sandal-wood." "Rosewood." "Balvory" of some Queensland aboriginals.

Wood very hard, brown, beautifully grained, and very fragrant. It affords handsome veneers for the cabinet-maker. Owing to a strong aromatic odour, resembling that of sandal-wood, furniture made of this timber is said to be free from the attacks of insects. (Thozet.)

"It is said that this wood will keep away the *Blatta* or cockroach. I cannot confirm this statement. I had a good-sized billet cut and planed, and the odour from it was so strong as to perfume one of my trunks in which it was placed, but the cockroaches treated it with the utmost disdain. They ran over it and laid their eggs under it just as if it had been put there for their accommodation." (Tenison-Woods, *Proc. Linn. Soc., N.S.W.*, vii., 574.) Diameter, 9 to 12in.; height, 20 to 30ft.

South Australia, New South Wales and Queensland.

254. **Eremophila Sturtii,** *R.Br.*, N.O., Myoporineæ, B.Fl., v., 21.

"Scentless Sandal-wood."

A tall shrub; wood of a grey colour, hard, close-grained, and nicely marked.

South Australia and New South Wales.

255. **Erythrina indica,** *Lam.*, (Syn. *E. Corallodendron,* Forst., *non* Linn.); N.O., Leguminosæ, B.Fl., ii., 253.

"Indian Coral Tree."

In India and the Straits Settlements this tree is employed for supporting the weak stems of the pepper plant, for which purpose it is kept dwarf. It affords a very soft, porous wood, greatly used in India for making toys, light boxes, and similar articles, which are usually overlaid with a thick coating of varnish or lacquer. (*Treasury of Botany.*) Its weight is about 18lb. to the cubic foot (Gamble, *Manual of Indian Timbers*). It is soon attacked by insects.

New South Wales, Queensland and Northern Australia.

256. **Erythrina vespertilio,** *Bentham*, N.O., Leguminosæ, B.Fl., ii., 253.

"Batswing Coral." "Coral Tree." "Cork Tree." "Heilaman Tree." "Wotheugn" of some Queensland aboriginals.

The wood is soft, and used by the aborigines for making their "heilamans," or shields. It is exceedingly light and spongy, and of the greatest difficulty to work up to get anything like a surface for polishing. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having

been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 16lb. 7oz. per cubic foot. It might perhaps be useful for floats for fishing-nets. M. Thozet states that the logs used to be used by the aboriginals for crossing rivers and creeks. Diameter, 12 to 25in.; height, 30 to 40ft.

South Australia, Queensland, Northern Australia and Western Australia.

257. **Erythrophlæum Laboucherii,** *F.v.M.*, (Syn. *Laboucheria chlorostachys*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 297.

"Ah-pill" of the aboriginals of the Mitchell River (North Queensland). Probably the "Leguminous Ironbark," frequently mentioned by Leichhardt, *Overland Journey to Port Essington.*

Wood red, very hard, the hardest in Australia, close-grained, and very durable. (*Cat. Queensland Timbers, Col. and Ind Exh.*, 1886.)

Queensland and Northern Australia.

258. **Erythroxylon australe,** *F.v.M.*, N.O., Lineæ, B.Fl., i., 284. *Erythroxylum* in Muell. Cens.

Wood hard and tough, and takes a good polish; it can be used for cabinet-work; it is red, and prettily marked. Diameter, 4 to 15in.; height, 20 to 30ft.

Queensland.

EUCALYPTUS TIMBERS.

[PRELIMINARY REMARKS.]

Scarcely a branch of Australian economic botany is in a more confused state than that which pertains to the timber of the Eucalypts. The genus is perhaps the most difficult one in the world, intrinsically, and also because of accidental circumstances, *i.e.*, difficulty of obtaining flowers and fruit, and irregular flowering seasons; moreover, the trees vary according to climate and soil to such an extent as to render the definition of a species rather expansive, and as this difference often extends to the wood, timbers of totally different character are sometimes reckoned under the same species.

In consequence, the botanical synonyms are very numerous, and this being so, the non-botanist must not be upbraided for his formidable list of vernacular names. These names have been given at some length in the following pages, as a practical knowledge of Eucalyptus timbers cannot be dissociated from them, and surely no other genus has ever been honoured by such a number. The author believes that it will be found that some of the vernacular names given have been assigned to wrong species by some observers, but he offers the notes as a contribution towards the compilation of a glossary of Eucalypt names. He would be grateful for corrections and criticisms.

Mr. Bäuerlen informs the author of his belief that species of Eucalyptus can be unerringly determined by means of the leaf-galls. He made the observation at first very diffidently, but subsequent experience seems to bear out his view to some extent. The author is aware that the late Mr. W. Sharp Macleay long ago used to favour a somewhat similar idea. In the Technological Museum the variety of Eucalyptus galls is great. The subject is interesting, but much more evidence requires to be collected before an authoritative opinion can be pronounced.

Mr. Henry Deane informs the author that in the Cooma district, New South Wales, Eucalyptus timber which assumes a white or hoary appearance on the outside, is considered to be durable.

Wherever he could, the author has quoted the opinions of unbiassed people outside the colonies. The opinions of Mr. Laslett, late Timber Inspector to the Admiralty, are, on the whole, not favourable to Eucalyptus timbers. But much of the "shake" noticed in the large logs, and to which all timber of this kind seems liable, appears to be preventable wholly, or in part, by proper seasoning, careful felling, so that the trees do not come down with a crash, and rejection of trees of the largest size.

The experiments of Mr. Allen Ransome on samples of timber sent to the Colonial and Indian Exhibition of 1886 are more favourable, but it is a pity that the samples at his disposal were so few and so small, and, consequently, his reports so brief.

259. **Eucalyptus acmenioides,** *Schauer.*, (Syn. *E. pilularis*, var. *? acmenioides*, Benth.; *E. trianthos*, Link.); B.Fl., iii., 208.

The "White Mahogany" of New South Wales, and the "Stringybark" of Rockingham Bay (Queensland). Called also "Broad-leaved Box." The "Jundera" of some Richmond River (New South Wales) aboriginals.

Timber heavy (Baron Mueller gives the specific gravity of a sample of this timber as 1.066, which would be about 67¼lb. per cubic foot), strong and durable; it has been found good for flooring-boards, slabs, rails and palings; it is readily fissile like stringybark, but heavier and more durable. Its palings are not apt to warp when exposed. Dr. Woolls says: "It has a satiny lustre when planed, and is sometimes prettily waved." At the London Exhibition of 1862, there was exhibited (*Cat.* No. 45) a sample of timber from Brisbane Water as "White Mahogany," and said to be "a good building timber." It probably belonged to this species. Diameter, 18 to 30in.; height, 40 to 60ft.

South Australia, New South Wales and South Queensland, but not far inland.

260. **Eucalyptus amygdalina,** *Labill.*, (Syn. *E. fissilis*, *F.v.M.*; *E. radiata*, Sieb.; *E. elata*, Dehn.; *E. tenuriamis*, Miq.; *E. nitida*, Hook, f.; *E. longifolia*, Lindl.; *E. Lindleyana*, DC.; and perhaps *E. Risdoni*, Hook, f.; (Risdon or Drooping Gum, a separate species in B.Fl., iii., 203); *E. dives*, Schauer.; B.Fl., iii., 202. A tall variety has been called *E. amydalina* var. *regnans*.

This Eucalypt has even more vernacular names than botanical synonyms. It is one of the "Peppermint Trees" (and variously "Narrow-leaved Peppermint," "Brown Peppermint," "White Peppermint," and sometimes "Dandenong Peppermint"), and "Mountain Ashes" of the Dandenong Ranges of Victoria, and also of Tasmania and Southern New South Wales. It is also called "Giant Gum" and "White Gum." In Victoria it is one of the "Red Gums." It is one of the New South Wales "Stringybarks," and a "Manna Gum." Because it is allied to, or associated with, "Stringybark," it is also known by the name of "Messmate."

* *E. amygdalina* of the Upper Yarra district (Victoria), and elsewhere, where it attains gigantic proportions, is called "Mountain Ash;" the same kind of Eucalyptus in other districts, where it is of smaller size, is designated "Peppermint." *(Report of Carriage Timber Board.)*

Allusion to its fibrous bark is also made in the aboriginal name in Gippsland of the tree ("Wangara"=bark-string). "Woorun" is the aboriginal name at Coranderrk Station (Victoria), while "Tirba-twebin" is the name at the same place given to the variety formerly called *E. fissilis.* A variety of this gum *(E. radiata)* is called in New South Wales "White Gum" or "River White Gum." The aboriginal name in the counties of Cumberland and Camden was "Kayer-ro." A variety of *E. amygdalina* growing in the south coast district of New South Wales, goes by the name of "Ribbon Gum," in allusion to the very thin, easily detachable, smooth bark. This is also *E. radiata* probably. A further New South Wales variety goes by the name of "Cut-tail" in the Braidwood district. The author has been unable to ascertain the meaning of this absurd designation. These varieties are, several of them, quite different in leaves, bark, and timber, aud there is no species better than the present one to illustrate the danger in attempting to fit botanical names on Eucalypts when only the vernacular names are known.

This is probably the tallest tree on the globe, individuals having been measured up to 400ft., 410ft., and in one case 420ft., with the length of the stem up to the first branch 295ft. The height of a tree at Mt. Baw Baw (Victoria) is quoted at 471ft.

This timber is useful for many kinds of carpentry work; in drying it does not twist. When it forms straight, long stems, as in rich forest valleys, it splits with remarkable facility, and in one particular instance a labourer split 620 five-foot palings in one day. The timber of *E. amygdalina* is, as a rule, particularly well adapted for shingles, palings and rails, and also for use in shipbuilding, especially keelsons and planking. It does not form a very superior fuel. (Mueller.)

"Cut-tail" grows with a straight bole over 200ft. high, and with a diameter of 6 to 8ft. Its wood is fissile in the highest degree, since it can be readily split almost to the thinness of paper. A sample of this timber from Haydon's Bog, near Delegate, cut in March, 1885, is in the Technological Museum. It is very straight in the grain (as might be expected), and very easy to work.

The timber of *E. amygdalina* is comparatively light, as it floats on water. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862 as *E. radiata*), has

a weight which corresponds to 48lb. 1oz. per cubic foot. (Baron Mueller gives the specific gravity of "Messmate" (*E. fissilis*) as .865 or about 54½lb. per cubic foot. (Other determinations of the specific gravity of timber of this species will be found in the tables.) This particular specimen was collected by Sir William Macarthur, and called by him "River Gum of Camden." He describes it (No. 109, *Catal. N.S.W. Timbers, Paris Exh.*, 1855) as a small, quick-growing species, very elegant when in blossom, found only on the immediate sandy banks of rivers, and the inner bark used for tying grafts, and for other similar common purposes. Diameter, 1 to 2ft.; height, 30 to 50ft. His disparaging remarks in regard to this tree, "of no value for timber," exactly tally with those of Dr. Woolls in regard to *E. radiata* (*infra*), yet this sample which has been worked up under the author's supervision, works splendidly, and is good to dress and plane up. It is light in weight, and of a light-buff colour. It appears to be a useful timber, but it is only right to say that these remarks are based upon a small slab.

Speaking of *E. radiata* (now merged in this species), the Revd. Dr. Woolls calls it a brittle wood. He does not approve of it being merged in *E. amygdalina* for the reasons given in *Proc. Linn. Soc. N.S.W.*, v., 448, and he is not alone in that opinion.

Mr. W. Archer (*Proc. R.S. Tasmania*, 1864) says *E. radiata* is called "Curly White Gum" in Tasmania, and by the sawyers "Bastard White Gum." The trunk is often twisted, the timber curly, and the branches weeping. (But is not this "weeping" appearance rather more characteristic of the variety *E. Risdoni*?).

Tasmania, South and East Victoria; coastal districts of New South Wales (not extending far to either west or north).

The timber of this species, or rather that of the Victorian "Mountain Ash," called *regnans*, is one of four colonial timbers recommended by the Victorian Carriage Board for the manufacture of railway carriages. The Board reports as follows: "Lacking the richness of colour of 'Blackwood' (*Acacia melanoxylon*), it is in appearance less attractive for carriage-building (the

practice with the Railway Department being not to paint its passenger stock, but to varnish), but in other respects we consider it, if not equal, second only to Blackwood for the purpose named.

It should be felled during the winter months, when it has attained maturity, and is at stump height, say between 4 and 5ft. diameter. For six months it might so remain before being broken down into plank for seasoning. The Otway Forest, Mirboo, and Narbethong were visited by a contingent of the Board, and both this timber and Blackwood were found in those localities to be of very superior quality, of large size, and abundant. Mountain Ash may be found of the finest quality in the ranges of felspar porphyry formation in the Upper Yarra district, especially those bordering the valley of the Watts." (These are all Victorian localities.)

A slab of the normal species in the Technological Museum, obtained from Victoria, is a very sound timber, close in the grain, and good to work. It is of a brown colour, and has a neat, and even pretty figure, disposed in stripes.

As illustrative of the durability of the timber of this species, Dr. Crowther, of Tasmania, showed at the New Zealand Exhibition of 1865 portions of stumps which had been felled thirty-two years (the stumps remaining in the ground), and except on the surface, they were as sound as if they had been freshly felled. A charred fence-post of the same wood which had stood in Burnt Island for thirty-eight years was in the same condition. But Baron Mueller (*Eucalyptographia*) expressly states: "It has not been found very lasting underground . . . indeed the stems, when fallen, perish more quickly than those of many other Eucalypts, and thus the records of individual trees of marvellous height, when measured lying on the ground, are often early lost."

There is another timber (at present at least included under *E. amygdalina*) which is very durable, especially under water. A specimen (in the Technological Museum), which formed part of the spoke of a mill-wheel for twenty years, and afterwards for a year was lying exposed to the weather, shows no signs of decay.

It is called "White Ironbark," or "Mountain Ash," and is found about Braidwood, New South Wales.

These variations in durability will be seen to be by no means the only instance of great difference in properties between timbers now included under the same species, and the question must sooner or later force itself on botanists—to what extent shall the properties of a timber be taken cognizance of in the determination of species? Difference in climate and soil are insufficient to account for the utter diversity of some timbers now included under the same species of Eucalyptus.

A log of "Messmate" timber, from Adelong, New South Wales, is in the Technological Museum. It was obtained from a small tree (diameter, 15 inches), has seasoned fairly well, is easy to work, and is of a rich reddish-brown colour.

The timber exhibited by Sir William Macarthur at the London Exhibition of 1862 (*Cat. N.S.W. Woods*, No. 40), and stated to be called in the Illawarra "Messmate" and "Warreeah" by the colonists and aboriginals respectively, belongs without doubt to this species. It is described as "A fine timber tree, very like stringybark, excepting towards the butt." Height, 80 to 130ft., diameter, 3 to 5ft. This sample cannot be distinguished (as far as appearance goes) from the specimen of "Mountain Ash" used as a mill-wheel, and above alluded to. It is of a dirty yellowish-brown, light, easy to work, straight in the grain, and a good splitting timber. It has a few borers.

Experiments on the Transverse Strength, etc., of the Wood of *E. amygdalina*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square. (See p. 344.)

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.12	.65	2195	1646	1.045	.878
.12	.70	2132	1599	1.076	.908

TIMBER EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

Local Name.	Botanical Name.	Locality Where Grown.	Approximate Date when the Timber was Cut.	Dimensions of Tree.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Trees grew.	Elevation above Sea-level.
Mountain Ash.	Eucalyptus amygdalina var *regnans*.*	Range south of Waterloo, Victoria.	0/6/79	5ft. diam.	24/1/84	7½	7.50	47.54	0.703	0.761	6.3.6	778.4	965.3	4	3.87	3.93	2635	Mesozoic	1250ft.
					24/1/84	8½					6.0.22			4½					
					28/1/84	7¾					7.1.5			3¾					
					31/1/84	6¾					7.1.4			3½					
					31/1/84	7½					7.0.19			3⅝					
Do.	Do.	Black Spur, Victorian State Forest.	Seasoned at least twelve months.	—	24/1/84	9	8.75		0.820		10.2.11	1152.3		4½	4.0			Felspar Porphyry	About 1500ft.
					7/2/84	8¾					9.3.20			3½					
					7/2/84	8½					10.1.10			4					

* Synonymous with *E. regnans*, and called in the Dandenong Ranges "White Gum" also.

261. **Eucalyptus Baileyana,** *F.v.M.*, Fragm., xi., 37.

A "Stringybark."

Wood of a light-grey colour, very tough, suitable for tool handles and other purposes where toughness is required. It is of very limited occurrence, and little is known about it at present.

Near Brisbane.

262. **Eucalyptus botryoides,** *Smith*, (Syn. *E. platypodos*, Cav.); B.Fl., iii., 229.

The "Blue Gum" of New South Wales coast districts. "Bastard Mahogany" of Gippsland and New South Wales; called also "Swamp Mahogany" in Victoria and New South Wales. It also bears the names of "Bastard Jarrah," and occasionally "Woolly Butt." Sydney workmen often give it the name "Bangalay,"* by which it was formerly known by the aboriginals of Port Jackson. It is called "Binnak" by the aboriginals of East Gippsland.

A valuable timber, hard, tough, and durable. Used for felloes of wheels, and one of the finest timbers for ship-building. (Hill.) When the tree has grown on rich soil among running streams its timber is regarded as one of the best amongst Eucalypts, and is† then utilised for the manufacture of waggons, trucks, all the heavier kinds of wheelwrights' work, particularly felloes; it is also very eligible for shingles, as water does not become discoloured by them. (Mueller.) When the tree grows on coast sands its wood is still useful for sawing and fencing, though the stems are often gnarled. (Kirton.) It is sought also for knees of vessels or boats; the timber is usually sound to the centre. The various accounts given of the durability underground of this timber are contradictory. (Mueller.) The Baron, however, instances a case in which no decay was observable in posts which had been in use fourteen years. It does not split well. In external appearance and timber it seems to merge into *E. saligna*.

* Pronounced Bang alley.

† It is one of four colonial timbers recommended by the Victorian Carriage Timber Board for use in the construction of railway carriages. Specimens from Gippsland ("Gippsland Mahogany") are spoken of as "a timber of good colour, as strong as 'Blue Gum' (*E. globulus*), but of less specific gravity."

A tree called "White Gum," or "Scribbly Gum," in the neighbourhood of Cambewarra* (between Moss Vale and Shoalhaven, New South Wales), has been pronounced by Baron Mueller to be *E. botryoides*. It has a height of 40 to 50ft., and a diameter of 2ft. On account of the abundant insect markings, and whitish, smooth appearance of the trunk, the author was inclined to think the tree *E. hæmastoma* in the absence (at that time) of any botanical specimens. The outer bark is deciduous, and varies in colour from white, through yellow to light grey, and has an appearance which may best be described as "soapy."

A slab of wood of this species from Victoria is in the Technological Museum. It is of a warm rich brown colour, and of fine grain, but shows shakes and gum-veins.

According to Bentham (*B.Fl.*) a sample of timber exhibited by Mr. Edward Hill, *not* by Sir William Macarthur (as stated in the Flora), at the Paris Exhibition of 1855, and marked 91, is of this species. It was also exhibited at the London Exhibition of 1862, and marked 18. It came from Brisbane Water, where it bore the aboriginal name of "Couranga," and was also called "Blue Gum" of the coast districts. It "attains a diameter of 7ft. without natural unsoundness within ; considered to be the finest timber for ship-building, but not so hard, and probably not so durable as the Ironbarks." Diameter, 40 to 60in. ; height, 100 to 160ft. (See page 437.)

The author is of opinion that the sample (No. 94, *Cat. N.S.W. Timbers, Paris Exh.*, 1855, and No. 42, *Lond. Exh.*, 1862) should be referred to this species. The names given to it are in the Paris Catalogue "Rough-barked Gum," name at Illawarra, and "Burram-burrang," an aboriginal name at the same place; and in the London Catalogue: "Swamp Mahogany" and "Bangalay," both in use at Brisbane Water. Diameter, 30 to 36in.; height, 40 to 80ft. "A good hardwood timber tree." *(Paris Catal.)* "A crooked-growing tree, the timber much valued for knees and crooked timbers of coasting vessels. *(London Catal.)* It is of a light, dull red colour, close and straight in the grain, and easy to work. This sample has a shake in it.

* This is the most southern locality yet recorded for this species.

No. 25 in the *London Exhibition Catalogue* undoubtedly also belongs to this species. The author arrived at this decision ignorant of the fact that its vernacular names (" Rough-barked Gum" and " Burram-burrang") were also borne by the tree which yielded the last specimen. This tree is described as 36 to 48in. in diameter, and 80 to 90ft. in height, and it is said to yield " a good hardwood timber." The present sample has a red colour, somewhat disposed in stripes, has a close, even grain, is tough, and a splendid working timber. It is evidently from a comparatively free-growing tree. It has split somewhat, apparently in the drying.

The timber (No. 136, *Cat. Paris Exh.*, 1855, and No. 43 *London Exh.*, 1862) should also be referred to this species. In the former catalogue Sir William Macarthur describes it as the " Swamp Mahogany" of Camden, and as "a fine species, with handsome foliage, yielding fine timber, but not of such strength and durability as many other kinds. Diameter, 36 to 48in.; height, 80 to 100ft." *E. robusta* has " handsome foliage," and is also a " Swamp Mahogany," but this timber is more like the type samples of *E. botryoides*). In the 1862 catalogue the Camden aboriginal name is given as " Burram Murra," and it is stated to be " a useful timber for inside work." It is of a light brown colour, light in weight, and exceedingly good to work. Diameter, 30 to 50in. ("up to 8ft." Mueller); height, 70 to 100ft.

The Board also experimented upon a piece of " Blue Gum" from " Queensland," which is called *E. botryoides* in their Report. This is a mistake. The Queensland Blue Gum is *E. saligna*. (q.v.) The confusion in nomenclature has arisen in this way. In B.Fl., iii., 229, Bentham puts *E. botryoides* as indigenous in Queensland, on the ground that Sir William Macarthur's sample of wood, No. 91, *Catalogue of N.S.W., etc., Timbers at the Paris Exhibition*, 1855, came from Brisbane. This is a clerical error for Brisbane *Water*, near Sydney. It is as well to draw attention to this inadvertence, inasmuch as (presumably following Bentham) Bailey has included this species in his *Syn. Queensland Flora*, and it has even caused Baron Mueller (*Eucalyptographia*), to hesitate as to whether *E. botryoides* is found in Queensland or not. The original timber specimen referred to by Bentham is in the author's charge.

TIMBER EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7′ 0″ in length by $1\frac{7}{8}$″ square; the distance between the bearings was 6′ 0″; and the weight was gradually applied in the centre until the sample broke.

Local Name.	Botanical Name.	Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Tree grew.	Elevation above Sea-level.
Gipps-land mahogany	*E. botryoides.*	North-eastern Gippsland.	Do.	4/3/84 4/3/84 4/3/84 4/3/84	10 9 9½ 9½	9.50	55.59	0.891	9.0.16 7.1.20 9.0.8 7.2.14	931.5	5¼ 4 4½ 3¼	4.25	4.25	2543	Miocene.	Low-lying Ground

Eastern Victoria, and in the coastal districts of New South Wales. (See page 437.)

263. **Eucalyptus calophylla,** *R.Br.*, (Syn. *E. splachnocarpa*, Hook.); B.Fl., iii., 255.

The "Red Gum" of Western Australia.

The wood is tough, and is, therefore, drawn into use for naves, spokes, harrows, ploughs, shafts, and handles; it is also useful for frames, rails, and various building purposes, but it is not durable underground. (Mueller.) In an official report it is stated that this Eucalypt covers 800 square miles of country. Height, up to 150ft.

Found in South Western Australia.

264. **Eucalyptus capitellata,** *Smith*, (Syn. *E. piperita*, Smith, in White's Voyage, 216; *E. piperita*, Reichb.); B.Fl., iii., 206.

One of the common "Stringybarks" of the neighbourhood of Sydney, and farther south. By way of distinction it is often called "White Stringybark." In the New England district of New South Wales it bears the name of "Spotted Gum," from the bark falling off in patches. It is one of the numerous "Peppermints" of New South Wales and Victoria, and is noteworthy as being the first Eucalypt so called, at any rate in print. (See White's *Voyage to New South Wales*, *loc. cit.*) By the aboriginals of Gippsland it is called "Yangoora."

It is a good timber for splitting, and is hence much used for posts, rails, buildings, and fuel. It is said to be tough, strong, and durable.

There was exhibited at the Paris Exhibition of 1855 (No. 96), and at the London Exhibition of 1862 (No. 46), a timber which the author takes to be of this species. It is thus described:—"Aboriginal name, 'Dtha-dthang;' colonial name, 'Stringybark.' The coast variety: one of the most prized of the colonial hardwoods for house-carpentry; differs from the tree of the same name growing further inland" (*Paris Exh. Cat.*) "Stringybark of coast," "Dthah-dthaang" of the Illawarra natives, "Ngneureung" of those of Brisbane Water. Height, 80 to 120ft.; diameter, 3 to 5ft." (*London Exh. Cat.*)

Mr. J. M. Balfour (*op. cit.*, p. 341) experimented on a timber from George's River, near Sydney, labelled "Stringybark,"

"Dthah-dthaang," which may be of this species. He says "this timber is not very highly prized." He finds its specific gravity to be .838 (or 52.26lb. per cubic foot), the value of E to be 175.14, and of S 212.2.

Further particulars in regard to the timber of this species would be very desirable. Height, up to 200ft.

Queensland, New South Wales and Eastern Victoria.

265. **Eucalyptus clavigera,** *A. Cunn.*, (Syn. *E. polysciadia*, F.v.M.); B.Fl., iii., 250.

The wood of this large shrub or small tree is of a dark-brown colour, close in the grain, hard, and durable. It is a little known Eucalypt.

Queensland and Northern Australia.

266. **Eucalyptus cornuta,** *Labill.*, (incl. *E. Lehmanni*, Preiss; *E. macrocera*, Turcz.; *Symphomyrtus Lehmanni*, Schauer; *E. annulata*, Benth.; a separate species in B.Fl., iii., 234.) B.Fl., iii., 234.

The "Yate," or "Yeit," of Western Australia.

This hard and elastic wood is sought particularly for cart-shafts, agricultural implements, and boat-ribs, being for these purposes as useful as *E. loxophleba*, and approaching in value to English Ash. It is a heavy wood, sinking in water even when well dried, being the heaviest of all West Australian timbers; when air-dried it has a specific gravity of 1.235. (Mueller.) Height, up to 100ft.

South Western Australia.

267. **Eucalyptus corymbosa,** *Smith*, (Syn. *Metrosideros gummifera*, Soland.); B.Fl., iii., 256.

The "Bloodwood" of New South Wales and Queensland. By the aboriginals of Southern Queensland it is called "Boona."

On account of being subject to gum-veins, it is not a favourite as sawn timber, but it is very durable, and is principally used for posts and rails, as it does not readily take fire, nor does it suffer much from white ants, and very little from damp situations. It is easily worked when fresh, but becomes very hard when dry.

Piles, sleepers, buildings, and jetties, also find use for it. Baron Mueller observes that it is less known to artizans than it deserves.

A log in the Technological Museum (from an unknown New South Wales locality) is from a tree with a diameter of 2ft. It has seasoned to a warm brown, shells in concentric layers following the gum-veins, and dresses very well and readily. A slab of Victorian timber is of a dark-red colour, is straight and close in the grain, but, as usual with this species, it is full of gum-veins.

The timber exhibited under this species at the London Exhibition of 1862, and called "The True or Yellow Box of the county of Camden" is, of course, not of this species, the mistake being clerical. (See *E. melliodora.*)

The timber exhibited (No. 103, Paris Exhibition, 1855, and No. 39, London Exhibition, 1862) under the name of "Blood-tree" and "Bloodwood" belongs to this species. In the Paris catalogue it is referred to as *E. paniculata*, in error; in the London catalogue no species-name is given. The Camden aborigines used to give it the name of "Mannen." Diameter, 2 to 3ft.; height, 50 to 120ft. "A fine-looking tree, its wood in bad repute for durability, but likely to be very good when not exposed to the weather." (*Paris Catal.*) (These early descriptions are sometimes not perfectly correct.) "A worthless sort of timber." (*London Catal.*) It is dark reddish-brown, very easy to work, but porous, and full of gum-veins.

At the Exhibition of 1862 there were exhibited two samples of timber (marked lviii. and lix. in the catalogue of N.S.W. timbers), both from "Clarence and Richmond open Forests." Both were called by the aboriginals "Weni Aabie," and the former by the colonists "Rough-barked Bloodwood," and the latter "Smooth-barked Bloodwood." They are thus described:—(lviii.) "Prevailing to a great extent; a tree of considerable size. Timber of great strength and very durable, both in and out of the ground. Used principally for posts and beams." (lix.) "This and the preceding are mere varieties of the species, and only to be distinguished from each other (by the bark?). Both are equally common, and used for the same purposes." The author has

examined these timbers, and finds them to belong to *E. corymbosa.* The former sample is of a red colour, fairly good to work, and shows gum-veins. The latter is a cleaner sample; and if obtainable in large pieces of as good quality, would be well adapted for cabinet-work. It is of a reddish-brown colour, comparatively light in weight, and fairly easy to work.

Specimens of this timber from Bowenfels, N.S.W., were used in the Sydney Mint experiments. The average dimensions of the trees were: height, 30 to 50ft.; diameter, 8 to 16in. Specific gravity, .853. Value of E, 434,200; of S, 2,310. Other specimens from Brisbane were from a tree 35ft. to the fork, and with a diameter of 21in. Specific gravity of wood, .983. Value of E, 364,700; of S, 1,680. Diameter, 2 to 4ft.; height, 80 to 100ft.

Eastern New South Wales and Southern Queensland.

268. **Eucalyptus corynocalyx,** *F.v.M.*, (Syn., *E. cladocalyx*, F.v.M.); B.Fl., iii., 218.

Sometimes called "Sugar Gum," on account of its sweetish foliage, which attracts cattle and sheep.

This timber is remarkably heavy, much more so than *E. rostrata;* it has great lateral strength, is very hard when dry, of a yellowish-white colour, and its durability and power of resistance against damp-rot, and the attacks of white ants, are of a high order. One of its chief recommendations is that, of all our colonial timbers, it is the least likely to warp when exposed to the weather. The timber is used for fencing purposes generally, railway sleepers, joists and rafters, piles, planking, naves, and felloes of wheels. (J. E. Brown.) This tree grows under the most unfavourable circumstances, when most other species have been killed by the drought. Baron Mueller notes that a post of this tree which had been fifteen years in the ground showed no signs of decay. Diameter, 5 to 6ft.; height, 120ft.

South Australia.

269. **Eucalyptus crebra,** *F.v.M.*, (Syn. *E. resinifera*, A. Cunn.; *Metrosideros salicifolium* var. β. Solander (perhaps), *E.*

angustifolia, Woolls; and including *E. melanophloia*, F.v.M.); B.Fl., iii., 221.

"White," "Red," or "Narrow-leaved Ironbark," and sometimes "Grey Ironbark," or "Grey Gum."

An excellent timber; hard, tough, of inlocked fibre, durable and useful for many building purposes. It is much in use for fence-posts, railway cross-ties, bridge material, piles, waggon-building, etc., including spokes of wheels.

Mr. Allen Ransome examined samples of this timber sent from New South Wales to the Colonial and Indian Exhibition, 1886, and reported: "spokes were turned from the sample, and boards planed, the finish of both being excellent."

A log of this timber sent to the Technological Museum is described as "Grey Ironbark," and no more definite locality than "Eastern N.S.W." is given. It was cut from a tree 2½ft. in diameter, is of a rich brown colour, is hard to work, and is full of shakes.

This is probably the species called in the Sydney Mint experiments (1860) "Narrow-leaved Ironbark." It is described as of excellent quality, and very durable. It came from Singleton, N.S.W. The trees were from 20 to 70ft. to the fork, and had an average diameter of 10 to 12in. (maximum 3ft.) exclusive of the bark. Specific gravity, 1.119; value of E, 534300; of S, 2688. Timber called "Ironbark" was also examined in the Sydney Mint experiments of 1858. This was probably the same species as the latter, as both samples were collected at the same place by the same gentleman (Mr. Collett). Captain Ward gives the specific gravity at 1.211; the value of E, 417400; and of S, 2288.

A slab of "Narrow-leaved Ironbark" from Appin, shown at the London Exhibition of 1862, as No. 8 (and previously at the Paris Exhibition of 1855, as 123b), is exceedingly like the log of *E. crebra* above referred to, and the author does not hesitate to refer it to this species. Diameter, 24 to 48in.; height, 60 to 100ft. It is of a dark purplish colour, cross-grained, tough and hard, tearing much under the plane. It is very heavy.

Mr. Byerley (see p. 343) experimented upon some Queensland timber of this species, and found a rod of 1in. section and

12in. long, to bear 970lbs. before breaking. Diameter, 20 to 36in.; height, 70 to 90ft.

Coastal districts of Queensland and New South Wales, from near the Gulf of Carpentaria to Port Jackson.

270. **Eucalyptus diversicolor,** *F.v.M.*, (Syn. *E. colossea*, F.v.M.; and incl. *E. goniantha*, Turcz. (considered a separate species in B.Fl., iii., 248); B.Fl., iii., 251.

Commonly known as "Karri," but in its native habitat to a limited extent as "Blue Gum."

The wood is light-coloured, bends freely, is straight in the grain, and tough, but is not so easily wrought as *E. marginata* (Jarrah); it is particularly in request for large planks, and also for spokes, felloes, and rails; it has also come into use for ship-building—for planks, rudders, and even masts. A case is on record of a baulk of this timber which had been exposed in the wash of the tides at Cape Leeuwin for twenty-six years, continuing sound. The durability of this timber for lengthened periods underground yet remains to be proved. (Mueller.) In an official report it is stated that this Eucalypt covers 2,300 square miles of country.

"The wood is red in colour (Baron Mueller speaks of it as light coloured, *supra*), hard, heavy, strong, tough, and slightly wavy or curled in the grain, but it has no figure to recommend it for cabinet purposes. Six logs of this timber, viz.: two of 12 x 12in. x 28ft., one of 12 x 12in. x 34ft., two of 24 x 24in. x 24ft., and one of 24 x 24in. x 32ft., were recently shipped at Fremantle by the Western Australian Government for delivery at one of the Royal Dockyards in England, for experimental trial in the navy, the colonists being of opinion that it will ere long be in great request for ship-building and other architectural works. Unfortunately all these logs had the defect of star-shake, which rendered them unfit for almost any purpose except where they could be employed in very large scantlings. It was also noticed that the Karri had the peculiar blistery appearance of the annual layers, also common to the Jarrah, consequently this wood is not considered to be suitable for any work requiring nicety of finish,

although, no doubt, it would be admirably suited for piles for jetties, bridges, etc., and generally for heavy structures where large scantlings and great strength are required. It will not last between wind and earth, though as far as is yet known, it resists the action of water. It is much to be regretted that a tree so noble in its dimensions should prove so disappointing in its character, but like the Jarrah, to which it has some resemblance, it is not, I think, likely to be in request for architectural works in England." (Laslett, *Timber and Timber Trees*, 1875.)

This timber, sent to the Colonial and Indian Exhibition, was tested by Mr. Allen Ransome. He thus reports: "A log 3ft. in diameter, planted in the yard at Stanley Works to represent a growing tree, was cut down by the Steam Tree Feller; and another log of the same size was cross-cut, as it lay on the ground, by a similar machine. In each case the operation was complete in about three minutes. The wood was operated upon in the following ways:—The rail-seatings were adzed on a sleeper, and the spike-holes bored, giving satisfactory results. A plank passed through the vertical frame produced clean sawn boards; spokes and hammer handles were also turned out satisfactorily. . . . It does not finish well in the planing and moulding machines."

TRANSVERSE EXPERIMENTS.

(*Laslett.*)

Number of the Specimen.	Deflections.			Total Weight required to Break each Piece.	Specific Gravity.	Weight Reduced to Specific Gravity, 1000.	Weight Required to Break 1 Square Inch.
	With the Apparatus Weighing 390lb.	After the Weight was removed.	At the crisis of Breaking.				
	Inches.	Inch.	Inches.	lbs.			lbs.
1	.75	.00	5.00	820	957	855	205.00
2	1.25	.00	6.25	725	885	819	181.25
3	1.35	.10	4.60	955	1023	934	238.75
4	.75	.05	7.50	840	987	851	210.00
5	1.00	.05	6.50	920	1013	908	230.00
6	1.00	.05	6.50	915	1023	903	228.75
Average	1.01	.04	6.06	862.5	981.33	878.33	215.625

Each piece broke with scarph-like fracture, 8 to 10 inches in length.

TENSILE EXPERIMENTS.

(Laslett.)

Number of Specimen.	Dimensions of each piece.	Specific gravity.	Weight the piece broke with.	Direct cohesion on 1 square inch.
	Inches.		Lbs.	Lbs.
7	2 x 2 x 30		31,080	7.770
8	2 x 2 x 30		30,800	7.700
9	2 x 2 x 30		31,360	7.840
10	2 x 2 x 30		31,360	7.840
11	2 x 2 x 30		22,120	5.530
12	2 x 2 x 30		22,960	5.740
Average		·981	28,280	7.070

VERTICAL OR CRUSHING STRAIN ON CUBES OF SIX INCHES.

No. 13. Tons.	No. 14. Tons.	Total. Tons.	Average. Tons.	Ditto on 1 square inch. Tons.
175	195	370	185	5.14

E = 930,940. S = 2,264.

TABLE SHOWING COMPARATIVE TESTS OF "INDIAN TEAK" AND "ENGLISH OAK."

Compared with Western Australian Tuart *(E. gomphocephala)*, Jarrah *(E. marginata)*, and Karri *(E. diversicolor)*.

Name of wood	Weight per cubic foot.	Specific gravity.	Transverse strength per square inch.	Average Tensile Experiments. Dimensions of each piece	Average Tensile Experiments. Weight the piece broke with	Average Tensile Experiments. Direct cohesion of 1 sq. in.	Vertical or crushing strains on cubes of 2in.	Number of years assigned by E'glish Lloyds for ship-building purposes.
	Lbs.		Value of S.	Inches.	Lbs. per sq. in.	Lbs. per sq. in.	In tons per sq. in.	
Indian Teak	49.47	807	2203	2 x 2 x 30	13,207	3,301	2838	14 yrs.
English Oak	31.72	886	2117	2 x 2 x 30	30,287	7,571	3411	9 "
Tuart	73.06	1169	2701	2 x 2 x 30	40,487	10,284	4195	—
Jarrah	63.12	1010	1800	2 x 2 x 30	11,760	2,940	3198	12 "
Karri	61.31	981	2264	2 x 2 x 30	28,280	7,070	5140	12 "

From the Official Catalogue of Western Australia, Melbourne International Exhibition, 1880.

"KARRI" (*E. diversicolor*) EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Sample in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflections at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.
Western Australia.	Seasoned at least 12 months.	31/1/84 4/2/84 31/1/84	10¾ 9½ 11¼	10.50	61.44	0.988	8.2.16 8.0.8 9.0.0	960.0	4¼ 5½ 3⅞	4.54	4.54	2621

This is an enormous tree. Mr. Muir saw specimens about 300ft. up to their first branch, while Mr. Pemberton Walcott noticed (on the Warren River) one about 400ft. in total height, and widths of timber as much as 12ft. can be obtained from the tree.

South Western Australia.

271. **Eucalyptus doratoxylon**, *F.v.M.*, B.Fl., iii., 249.

"Spear-wood."

The aboriginals of Western Australia travel long distances to obtain saplings of this species for their spears, on account of the straightness of the stem, and the hardness and elasticity of the wood; hence its specific and vernacular names. Diameter, up to 3ft.; height, perhaps up to 80ft.

South Western Australia.

272. **Eucalyptus dumosa**, *A. Cunn.*, (Syn. *E. lamprocarpa*, F.v.M.; *E. fructicetorum*, F.v.M.; *E. santalifolia*, Miq., partly; non F.v.M.); B.Fl., iii., 230.

One of the trees called "Mallee," owing to its helping to form part of the vegetation called "Mallee Scrub." The aboriginal name for this scrub is "Weir-Mallee." It forms with *E. gracilis* the Mallee country of Northern Victoria, southern New South Wales, etc.

This timber is used for firewood and fencing; it is hard and durable, but small. The same remarks would apply to other Mallee timbers.

273. **Eucalyptus eugenioides,** *Sieb.*, (Syn. *E. piperita*, var. *eugenioides*, Benth.; and probably *E. scabra*, Dumont.

A "Stringybark," and sometimes "White Stringybark," and "Broad-leaved Stringybark."

This wood is pale-coloured, splits well into shingles, palings, rails, and slabs, and can also be sawn into flooring-boards, but it forms a very inferior fuel. It is stated to be somewhat less fissile than other Stringybark trees, but more lasting. (Mueller.) It is said to grow as high as 200ft., though the author has never seen it so high.

Eastern Victoria to Southern Queensland, usually at no great distance from the coast.

274. **Eucalyptus eximia,** *Schauer*, B.Fl., iii., 258.

By Sydney people this is variously known as "Mountain Bloodwood," "Yellow Bloodwood," and "Rusty Gum." It is called "Bloodwood" partly because kino exudes in the concentric circles of the wood (which kino, by the way, cannot be mistaken for that of *E. corymbosa*), and partly because its fruits are in shape very similar to those of *E. corymbosa*. Baron von Mueller states (*Eucalyptographia*) that it sometimes goes by the name of "Smooth-barked Bloodwood." The colour of the bark is a dirty yellow.

This tree does not afford durable timber, the wood being soft and light-coloured; it makes good fuel. It is a most valuable timber for the formation of waterworks; an instance is known in which a piece of this timber was 35 years under water, and no sign of decay was visible (*General Report, Sydney International Exhibition*, 1879). Height, up to 80ft.

Blue Mountains of New South Wales.

275. **Eucalyptus fœcunda,** *Schauer*. Possibly including *E. loxophleba*, Benth., (a separate species in B.Fl., iii., 252); (Syn. *E. amygdalina*, Schauer non Labill.; *E. fruticetorum*, F.v.M.); B.Fl., iii., 252.

By the aboriginals of Murchison River (Western Australia) this tree is known as "Ooragmandee." *E. loxophleba* is known by the aboriginal name of "Yandee," but usually to the colonists of Western Australia as "York Gum," as it is very abundant near the town of York.

A shrub or small tree. If *E. loxophleba* is a variety, it is a larger variety.

The aboriginals use the wood of this tree for making spears, on account of its hardness and elasticity. (Walcott.) Samples of this timber were sent to the Colonial and Indian Exhibition under the name "York Gum" (*E. loxophleba*). Mr. Allen Ransome reported as follows: "This is a light-pink wood, close-grained, hard, and heavy. The samples submitted, being very small, only spokes could be made from them; for which purpose the wood seems eminently adapted."

Western Australia.

276. **Eucalyptus gamophylla,** *F.v.M.*, Fragm. xi., 40.

The missionaries in Central Australia employ this wood for various utensils, it being easily worked, though widths above eight inches are not obtainable, and only a few kinds of timber are within their reach. (Mueller.)

Interior of South and Western Australia.

277. **Eucalyptus globulus,** *Labill.*, (Syn. *E. cordata*, Miq.; *E. diversifolia,* Miq.; and perhaps *E. glauca*, DC.; *E. pulverulenta*, Link.; *E. perfoliata*, Noisette); B.Fl., iii., 225.

The "Fever-tree" of the Continent of Europe. In Australia it is universally known as "Blue Gum," or rather "Tasmanian" or "Victorian Blue Gum" from the colour of its foliage. It is called "Ballook" by the aboriginals of Gippsland.

This tree has been largely cultivated on the Continent of Europe in some malarial localities, with remarkable success. Perhaps the most striking instance is that of the Roman Campagna planted by the Trappist Monks. (See "Oils," essential.)

Speaking of this tree, which has been planted in thousands in Southern California, Professor Rothrock believes that it will be more profitable to cultivate it in many places for its timber than to grow cereals. Consul Baker (*U.S. Consular Reports*, Nov. and Dec., 1882, p. 403) gives a glowing account of the success which has attended the planting of Eucalypts in the neighbourhood of Buenos Ayres, and singles out this species for particular

recommendation. For a résumé of instances in which it has been utilized for subduing malaria, see the *Monthly Reports of the Department of Agriculture, U.S.A.*, 1873, p. 583.

The experience, however, of the Forest Department in India, in regard to the acclimatisation of this Eucalypt, is not so favourable.

"The *Eucalyptus globulus* has been tried at numerous places all over India, chiefly on account of the reports that it would prevent malaria, and that it was valuable in reclaiming marshy land. Whatever may be the truth about these questions, the tree has almost universally failed in the plains, and in the Himalayas it has only succeeded in a few localities. At Simla, whether from frost or for what reason, it seems to die down yearly, sending up vigorous shoots to replace the dead stem ; at Darjeeling its growth has been slow, and the trees formed merely thin poles, probably the effect of too much damp ; while its chief success has been at Ranikhet and Abbottabad." (Gamble, *Manual of Indian Timbers.*)

The following different testimony refers to the planting of this tree in Southern India :—

"*Eucalyptus globulus* is to be met with everywhere (Madras). It thrives in the most exposed situations, and in the poorest soils. Under adverse conditions a growth per annum of from three to four feet may be ensured, but in forest soil and a sheltered situation, a growth of from ten to twelve feet is not uncommon. At an elevation below 4000ft. the blue gum has a straggling, stunted growth, but above that, to 8000ft., no finer or more rapid-growing hardwood tree can be found. Private enterprise has taken up the planting of blue gum for fuel with an energy which in a few years will probably clothe the hill sides with an endless succession of plantations in every stage of growth. The price of the timber for fuel is three rupees per thousand pounds." (*Madras Mail.*) This is, say, 12s. 4d. per ton, and the planting is in its infancy. £1 per ton and more is the cost of Eucalyptus timber cut to lengths in the large cities of Australia.

En parenthèse, it may be remarked that while we in Australia are very prone to recommend Eucalyptus planting to dwellers in

other countries for sanitary purposes, we do not follow our own precepts. It is a fact that comparatively very few Eucalypts are artificially planted in Australia, and yet most of its towns are like other towns in having low-lying, damp portions, and typhoid fever carries off a terribly sad proportion of their population. It is also a fact that the orthodox method of improving (?) land is to fell the trees (generally Eucalypts) which grow upon it. In preparing suburban land for purposes of sale it is usually the object to eradicate every trace of vegetable growth, and the idea of leaving say one Eucalypt to each allotment for the purpose of desiccating the ground seems never to be thought of.

Baron Mueller attributes the salubrity of Eucalyptus regions to the following causes:—1. Their ready and copious absorption of moisture from the soil. 2. Their corresponding power of exhalation, much greater than that of many other kinds of trees. 3. Their evolution of a peculiar, highly antiseptic, volatile oil. 4. The disinfecting action of the fallen leaves on decaying organic matter in the soil. Eucalyptus leaves create no noxious effluvia by their own decomposition.

E. globulus has been introduced experimentally in India, in the Nilgiris and Punjab. In the former hills the growth has been 9ft. girth in 20 years. (Brandis.) The wood of a tree grown on the Nilgiris, 18 years old and 95ft. high, is grey, with darker streaks, and moderately hard. Pores moderate-sized, round, frequently arranged in groups or in radial or oblique lines. Medullary rays fine, very numerous, the intervals between the rays smaller than the diameter of the pores. Pores marked on a longitudinal section, and medullary rays visible as narrow bands on a radial section.

Mr. Gass found in the Newman plantation, then five to six years old, an amount of material of 152 tons per acre, and Colonel Beddome is of opinion that the best treatment of Eucalyptus plantations, so as to get the greatest profit, will be to cut for coppice every five or six years, obtaining at the cuttings at least 100 tons per acre. (Gamble, *Manual of Indian Timbers.*)

The timber of *E. globulus* is of a rather pale colour, hard, heavy, strong, and durable, more twisted than that of *E. obliqua*,

E. amygdalina, and many other fissile kinds, but not so interlocked as that of *E. rostrata*, *E. melliodora*, and most of the species called "Box Trees." Its specific gravity varies between .698 and 1.108. (See below for Laslett's and other determinations for comparison.) In transverse strain its strength is about equal to English Oak. In durability, it occupies a medium position amongst Eucalypts.

The following is the number of years assigned to the sound wood of *E. globulus*:—For floors of ships, first and second futtocks, main and rider-keelson, beams and hook, 10 years; for third futtocks and top-timbers, stem and stern-posts, transomes, knight-heads, hawse-timbers, apron, deadwood, knees, rudder, windlass, timber and bilge-strakes, and ceilings between, clamps, stringers, shelf-pieces and lower deck-waterways, 9 years; for light water-mark to wales, topsides, sheer-strakes, upper deck-waterways, spirkiting and plank sheers, 8 years; keel to first futtock-heads, thence to light watermark, 12 years. This wood is also very extensively used by carriage-builders* and manufacturers of implements; for instance, for poles and shafts of light and heavy vehicles, for undercarriage work, swivel-trees, spokes and rims, axle beds, plough-bars, handles of axes, picks, shovels, forks, hoes, and hammers, and all other similar purposes. It is furthur used for telegraph poles, for planking of bridges and jetties, and for structures in water. For railway sleepers it was formerly largely employed, but during late years it has given way to the wood of *E. rostrata* for this purpose. Settlers used the wood of *E. globulus* for fencing, especially for rails where it is readily obtainable. (Mueller.)

The following table taken from Rankine's *Manual of Civil Engineering* shows the comparative durability of some kinds of timber for ship-building, as estimated by the Committee of Lloyds:—

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* In the report of the Victorian Carriage Board it is recommended as one of four colonial timbers suited for railway carriage building. It is recommended to treat it in the same way as "Mountain Ash" (see *E. amygdalina*), and Corner Inlet and Mirboo, Victoria, are recommended as suitable localities for procuring it.

Twelve years: Teak, British Oak, Mora, Greenheart, Ironbark*, Saul; ten years: Bay Mahogany, Cedar (*Juniperus Virginiana*); nine years: European Continental Oak, Chestnut, Blue Gum†, Stringybark (*Eucalyptus gigantea*)‡; down to four years, which is the length of time assessed to Hemlock Pine (North America).

In Tasmania, this timber is usually procured by hand-sawyers, who cut up the trees where they fall in the forest. It makes the very best planking for ships' bottoms. It has the property of swelling under water to such an extent that it becomes a matter of some difficulty to find the seams when the vessels are put upon the slips for coppering. But much judgment is required in selecting the timber. All pieces that contain heart-wood or sap-wood must be rejected. These are both worthless, and soon decay. The true serviceable blue gum must come from the circumference of the tree about midway between the bark and the centre. (Tenison-Woods.)

In 1865 there was taken out of the old Hobart Courthouse a beam of this wood which had remained there for 45 years. It was as sound as when fresh felled. Planks from Tasmania, between 80 and 90ft. in length, were shown at the London International Exhibition of 1862.

A sample of this timber, sent from Victoria to the Colonial and Indian Exhibition, was tested by Mr. Allen Ransome. He reported: "By way of testing the sample sent a sleeper was adzed and bored, and a panel planed. Both experiments proved very satisfactory, the latter especially so, as the wood was found to plane as well against the grain as with it."

The following account of this timber by an English expert (Laslett) will be of interest: "*Eucalyptus globulus* is a tree of straight growth, and attains a height of 200 to 300ft., with a diameter of from 6 to 25ft. Like the Jarrah (*E. marginata*), it is characteristic of the larger trees, that while they appear to be healthy and vigorous, and continue to increase in height and bulk, the centre wastes away near the root, and, when felled, they are often found hollow for some considerable distance up

* *E. siderophloia*, Benth. † *E. globulus*, Labill. ‡ *E. obliqua*, L'Hér.

from the butt. The dimensions of the serviceable logs which the trees yield will, therefore, depend much upon its soundness; but unquestionably very large scantlings can be procured from it if required. The wood is of a pale straw colour, hard, heavy, *moderately strong, tough, and with the grain twisted or curled.* In seasoning, deep shakes occur from the surface, aud it shrinks and warps considerably.

"I remember to have seen in one of the Royal Dockyards some extremely long and broad planks, or thick stuff, of this description of timber, which had been apparently flitched from some of the hollow trees before referred to. These, after being kept to season for a while, warped and split to such an excessive degree that it was impossible to use them for any planking purpose whatever. In consequence of this defect it was found necessary to reduce the planks to very short lengths, in order to utilize them at all, and so they passed to quite inferior services.

"A specimen log of Blue Gum, 31ft. x 24in. x 28in., was forwarded with other woods to the London Exhibition of 1862 by the Tasmanian Commissioners, and this, at the close of the Exhibition, was transferred to the Woolwich Dockyard for trial, experimentally, in ship-building. It came in, however, too late, just when wood was giving place to iron in this branch of architecture, so that no favourable opportunity ever offered for its employment. This log, although of very large dimensions, had been cut clear of the centre, and very probably had formed part of one of the hollow trees before alluded to, consequently the tree to which it belonged must have been at the least 6 to 7ft. in diameter. A plank six inches thick was cut from it, which quickly warped or twisted two inches, and ultimately went to three-and-a-half inches, and stood at that in 1870. Upon examination then, it was found to be full of deep, fine shakes, but otherwise it was not much changed, and there were no signs whatever of decay, although it had for a long time been exposed to the weather. It seems, therefore, likely to be a durable wood."

Four samples of this timber from Tasmania gave Mr. F. A. Campbell (*Proc. R.S., Vict.*, 1879) the following values in pounds per square inch, for the tensile strength :—26,500, 24,000, 29,800,

26,700. The timber was very good, well seasoned, and beautifully clean and straight in the grain.

Mr. J. M. Balfour (see p. 341) has experimented upon several samples of timber of this species, all from Tasmania, except perhaps the first:—

1. A fine, well-seasoned sample, cut from an old window sill. Specific gravity, 1.153 (or weight of cubic foot 71.871lb.); E, 322.2; S, 317. 2. Mean results with three samples:—Specific gravity, 1.014 (63.19lb. per cubic foot); E, 312; S, 269. 3. Mean results with four other samples:—Specific gravity, 1.078 (67.26lb. per cubic foot); E, 259.8; S, 239. 4. *Curled Blue Gum*; mean with five samples:—Specific gravity, .988 (61.57lb. per cubic foot); S, 95.8; E not given. *Summary*—General mean of eight experiments, *excluding* the curled variety: Specific gravity, 1.061 (66.17lb. per cubic foot); E, 291.1; S, 260. General mean of thirteen experiments, *including* the curled variety:—Specific gravity, 1.035 (64.5lb. per cubic foot); S, 196.8. The ordinary Blue Gum broke with a fibrous fracture, but all the samples of curled broke nearly straight across, though tried in all positions of the grain. "Obviously the 'curl' extends over a considerable thickness, and larger samples would probably give much higher results, as the timber looks well in large pieces." Attached to Mr. Balfour's result is the following note: "Diameter, 5 to 30ft.; average of those felled for use, 6ft.; height, 150 to 350ft."

Rankine gives the resistance to crushing of this timber (in pounds per square inch crushed along the grain) at 8800, and the specific gravity at .843 (1 cubic foot weighing 52.5lb.)

A tree of this species, measured at Tolosa (Tasmania) in 1848, had an estimated height of 330ft., and the actual measurements were—circumference at ground, 78ft. 9in.; at 6ft. above the ground, 71ft. 9in. (*Proc. R.S., V.D. Land*, 1851.) In moist and rich ground in Tasmania this tree attains a diameter of 24 to 30in. in twenty years. The diameter of the tree is greatly increased near the ground by the spreading of the bole, and, in consequence, the sawyers and splitters have to erect stages ten feet and more above the ground, and then chop and saw it through where the diameter is much less, say ten or twelve feet.

TASMANIAN BLUE GUM (*E. globulus*).

Experiments by Mr. James Mitchell. (See p. 338.)

No. of Experiment.	Name of Wood, etc. (1 to 15, each 7ft. long and 2in. square.)	Specific Gravity.	E Value of Elasticity. $E=\frac{l^2 w'}{ad^3 d}$	S Value of Strength. $S=\frac{l w}{4ad^2}$
1	Blue Gum, green piece, newly cut	1.027	6083932	1982
2	" " "	1.078	9845472	2100
3	" seasoned about 3 years ...	1.003	6022637	*1693
4	" " " 8 months ...	1.076	7260624	2149
5	" " " ...	1.034	13551368	2276
6	" " from 2 to 3 years ...	1.054	13025285	2701
7	" " " 4 to 5 " ..	1.078	11126670	2737
8	" " " 2 to 3 " ...	.987	12180827	2921
9	" " " 4 to 5 " ...	1.071	11692433	2921
10	" " " 3 years	.942	14271872	2945
11	" " yellow coloured ..	1.018	8791776	2969
12	" " brown "	.997	15478693	2992
13	" " curly gum	1.005	16420368	3242
14	" " brown coloured ...	1.008	14908785	3365
15	" " ...	1.089	13955485	3491
	Separate Experiment —			
16	Piece of keel from a steamer 5ft. long $1\frac{3}{4}$in. square	1.090	——	2213
	Weight reduced to 7ft. long and 2in. sq.	——	——	2210

* Contained much sap-wood.

TRANSVERSE EXPERIMENTS.

(*Laslett.*) See page 342.

Pieces 7ft. long by 2in. square. Weight suspended in the middle; both ends free.

No. of the Specimen.	Deflections. With the Apparatus weighing 390lb.	After the Weight was removed.	At the crisis of breaking.	Total weight required to break each piece.	Specific gravity.	Weight reduced to specific gravity 1000.	Weight required to break one square inch.
	Inches.	Inches.	Inches.	Lbs.			Lbs.
1	1.25	.15	4.50	767	1079	711	191.75
2	1.75	.20	3.75	602	997	604	150.50
3	1.35	.10	5.75	710	1037	684	177.50
4	1.00	.00	3.75	767	1108	692	191.75
5	1.25	.15	3.50	684	1026	666	171.00
6	1.00	.00	4.00	741	924	801	185.25
Average	1.26	.10	4.21	712	1029	693	177.96

Each piece broke with a short fracture.

TENSILE EXPERIMENTS.

(Laslett.)

Number of the specimen.	Dimensions of each piece.	Specific gravity.	Weight the piece broke with.	Direct cohesion on 1 square inch.
	Inches.		Lbs.	Lbs.
7	2 x 2 x 30	997	14560	3640
8		1079	26600	6650
9		1037	24360	6090
10		1108	26600	6650
11		1026	28840	7210
Average.		1049	24192	6048

VERTICAL OR CRUSHING STRAIN ON CUBES OF TWO INCHES.

No. 12. Tons.	No. 13. Tons.	No. 14. Tons.	No. 15. Tons.	No. 16. Tons.	No. 17. Tons.	Total. Tons.	Average. Tons.	Ditto on 1 square inch. Tons.
12875	13000	12750	11125	10500	13625	73875	12312	3078

E = 778300. S = 1869.

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF WOOD OF *E. globulus*, by Baron von Mueller and J. G. Luchmann. The pieces were two inches square, two feet long between the supports, the weight suspended in the middle, both ends free. The timber was seasoned nine months. (See page 344.)

No.	Deflection. With Apparatus Weighing 720lbs.	After the Weight was removed.	At the Crisis of Breaking.	Total weight required to Break each piece.	$S = \frac{LW}{4bd^2}$	Specific Gravity.
	Inches.	Inches.	Inches.	Lbs.		
1	.12	.04	.75	2444	1833	.938
2	.08	Nil.	.62	3224	2418	.992
3	.16	.04	.58	2256	1692	.913
4	.12	.04	.75	2661	1996	.942
5	.10	.02	.75	2740	2055	.946
6	.12	.03	.55	2288	1716	.927
7	.12	.02	.75	2409	1807	.924
8	.12	.04	.58	2280	1710	.845
9	.16	.04	.62	2252	1689	.852
10	.05	Nil.	.58	3752	2814	1.094
11	.08	Nil.	.65	3024	2268	1.096

$$S \text{ (strength)} = \frac{L \text{ (length)} \times W \text{ (weight)}}{4 \times b \text{ (breadth)} \times d^2 \text{ (depth}^2)}$$

"BLUE GUM" *(E. globulus)* EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was Cut.	Dimensions of Tree.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Trees grew.	Elevation above Sea-level.
Mirboo,		4ft.	7/2/84	11					9.1.25			3½					
Victoria	23/12/82	4⅝in.	28/1/84	10½	10.75		1.008		9.3.13	1111.6		4¼	4.16			Mesozoic	700 to 800ft.
		diam.	31/1/84	10¾					10.1.21			4¾					
Range south		3ft.	31/1/84	11					9.3.24			4½					
of Waterloo,	-/4/83	6in.	31/1/84	11¾	11.42	65.18	1.071	1.045	8.3.6	1023.6	1112.1	3¾	3.83	3.99	3.036	Mesozoic	About 1250ft.
Victoria.		diam.	4/2/84	11½					8.2.17			3¼					
Corner Inlet, S.E. Victoria	—	—	24/1/84	11¼	11.25		1.055		10.2.25	1201.0	—	—	—			Granite	—
Southern New	Seasoned		24/1/84	10¾					8.1.20			4⅜					
South Wales	at least twelve months.	—	31/1/84	11	10.58	61.91	0.992	0.992	6.3.9	851.6	851.6	3¾	4.12	4.12	2.325	—	—
			4/2/84	10					7.2.6			4¼					

Height, up to 300ft.

Tasmania, Southern and Eastern Victoria, and sparingly in Southern New South Wales.

278. **Eucalyptus gomphocephala,** *DC.*, B.Fl., iii., 231.

The "Touart," "Tooart," or "Tewart" of Western Australia. Sometimes called "White Gum."

This wood is of a pale yellowish colour, is remarkable for hardness and strength, is very heavy, of a close and twisted, and even curled grain, rendering it difficult to cleave, and (what in Eucalyptus timbers must be considered a particularly valuable quality) it shows no aptness to rend. (Mueller.) A sample sent to the Colonial and Indian Exhibition was examined by Mr. Allen Ransome, who thus reported on it: "This wood is of a light-brown colour, heavy, durable, and tough. From the sample sent, some felloes were shaped, and some spokes turned, the finish from both machines being all that could be desired."

The following information regarding this wood is taken from *Timber and Timber Trees*, by Thomas Laslett, late Timber Inspector to the Admiralty:—

"It is a very sound wood, possessing few or no defects, with the exception of a mild form of heart and star shake at the centre, which would necessitate a small amount of waste, if it were required to reduce the logs into thin planks or boards; but if employed in large scantlings, it will be found a most valuable wood, especially when great strength is needed.

"The Tewart shrinks very little in seasoning, and does not split while undergoing that process; it is also a characteristic of this wood that it will bear exposure to all the vicissitudes of weather for a long time without being in any but the least degree affected by it. I have known it subjected to this severe test for fully ten years, and when afterwards converted, it opened out with all the freshness of newly-felled timber. Possibly no better evidence is required to show that this is a durable wood.

"It is used in ship-building for beams, keelsons, stern-posts, engine-bearers, and for other works below the line of flotation, for which great strength is required, a weighty material in that position not being objectionable in a ship's construction.

"In civil architecture the Tewart is scarcely, if at all known in England, although it might be employed with advantage for many purposes. It would make good piles for piers, and supports in bridges, and be useful in the framing of dock-gates, as it withstands the action of water, and is one of the strongest woods known, whether to be tried transversely or otherwise. But it would probably be found too heavy for general use in the domestic arts."

It is not to be split, and is capable of enduring a great amount of heat without rending. It is used for keels, capstans, windlasses, naves of wheels, etc., also in the engine-rooms of vessels, where it is liable to exposure to great heat. Both this timber and Jarrah were used to a small extent in the construction of H.M.S. *Hannibal.*

TRANSVERSE EXPERIMENTS.

(Laslett.)

Number of Specimen.	Deflections. With the Apparatus Weighing 390lbs.	Deflections. After the Weight was removed.	Deflections. At the crisis of Breaking.	Total Weight required to Break each Piece.	Specific Gravity.	Weight reduced to Specific Gravity 1000.	Weight required to Break 1 square inch.
	Inches.	Inches.	Inches.	Lbs.			Lbs.
1	1.25	.15	4.50	1071	1147	942	267.75
2	1.25	.00	4.50	972	1173	829	243.00
3	1.15	.20	5.00	1032	1184	872	258.00
4	1.25	.15	5.00	1116	1147	973	279.00
5	1.35	.05	4.85	1017	1170	869	254.25
6	1.35	.10	4.65	966	1194	809	241.50
Average	1.27	.108	4.75	1029	1169.16	882.23	257.25

Each piece broke with moderate length of fracture, and very fibrous.

TENSILE EXPERIMENTS.

(Laslett.)

Number of Specimen.	Dimensions of each piece.	Specific Gravity.	Weight the piece broke with.	Direct cohesion on 1 square inch.
	Inches.		Lbs.	Lbs.
7	2 x 2 x 30	1147	32580	8820
8		1184	44520	11130
9		1173	46900	11745
10		1170	34160	8540
11		1147	34720	8680
12		1194	51240	12810
Average		1169	40687	10284

(For Vertical Experiments, see p. 462.)

"TUART" (*E. gomphocephala*) EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.
Western Australia.	Seasoned at least twelve months.	28.1.84	12	11.02	66.06	1117	1058	10.0.23	1110.0	1108.0	$3\frac{3}{4}$	3.79	4.02	3025
		4.2.84	12					10.0.2			4			
		4.2.84	$11\frac{3}{4}$					9.3.0			$3\frac{3}{4}$			
		31.1.84	$10\frac{3}{4}$	10.66		1000		9.3.11	1007.0		$4\frac{1}{2}$	4.25		
		4.2.84	$10\frac{1}{4}$					9.2.6			$4\frac{1}{4}$			
		4.2.84	11					9.3.26			$4\frac{1}{4}$			

N.B.—Under *E. diversicolor* will be found a table of comparative experiments with that timber, *E. gomphocephala*, *E. marginata*, English Oak, and Indian Teak.

VERTICAL EXPERIMENTS.

(*Laslett.*)

Number of the Specimen.	1 Inch. Crushed with.	2 Inches. Crushed with.	3 Inches. Crushed with.	4 Inches. Crushed with.
	Tons.	Tons.	Tons.	Tons.
13-16	4.000	16.875	37.625	67.00
17-20	4.500	16.750	33.125	64.25
21-22	4.625	16.500		
23-24	4.750	17.000		
Average	44.69	16.781	35.375	65.625
Do. per inch.	4.469	4.195	3.931	4.102
E = 776,990. S = 2,701.				

Height, up to 150ft.

Western Australia (south-west coast). In an official report it is stated to cover 500 square miles of country.

279. **Eucalyptus goniocalyx,** *F.v.M.*, (Syn. *E. elæophora*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 229.

This tree is variously known (in Victoria and about Twofold Bay, New South Wales) as "Spotted Gum," "Grey Gum" (East of Dividing Range), "White Gum" and "Blue Gum." It also has the names "Mountain Apple" (Queanbeyan to Cooma and Tumberumba), "Bastard Box," and "Grey Box," and in East Gippsland it goes by the name of "Mountain Ash."

This wood is hard and tough, usually free from kino-veins, varies from a pale yellowish to a brownish colour, is exceedingly durable, and lasts long underground, not warping, and on account of the interwoven woody fibres is almost as difficult to split as *E. rostrata.* It is much esteemed by wheelwrights, particularly for spokes, for ship and boat-building, for railway sleepers, and when not used for better purposes, it is sought for fuel. According to Mr. Boyle, the rough-barked variety from low, dry, and stony ranges, supplies a timber which wheelwrights consider equal to Ironbark, with the advantage of its not being so weighty; the taller mountain variety with smoother bark is more used for planks, piles, and general building purposes, the timber also in this instance being more durable than that from wet forest valleys. This wood resembles in many respects that of *E. globulus.* (Mueller.)

"BASTARD BOX," (*E. goniocalyx*) EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Tree grew.
North-eastern Victoria.	Seasoned at least twelve months	24.4.84	12	12.31	72.03	1.152	7.0.24	799.0	$5\frac{1}{8}$	5.25	2181	Palæozoic.
		24.4.84	$12\frac{5}{8}$				7.0.6		5			

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. goniocalyx*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long, and 2in. square :—

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.16	.50	2209	1658	.948	.807
.20	.58	2050	1537	·937	·798

A sample of *E. goniocalyx* timber (" Spotted Gum ") from Victoria, in the Technological Museum, is of a light-brown colour, straight in the grain, good to work, and free from gum-veins. Another slab, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 73lb. 15oz. per cubic foot. Mr. Henry Deane informs me that the rough-barked variety is known as " Mountain Apple " in the Queanbeyan District, New South Wales, and the smooth-barked variety takes the name " Grey Gum " east of the Dividing Range. Diameter, up to 6 and even 10ft.; height, up to 300ft.

Victoria and New South Wales, as far north as Braidwood.

280. **Eucalyptus gracilis,** *F.v.M.*, (Syn. *E. fruticetorum*, F.v.M.; partly ; *E. calycogona*, Turcz. ; *E. celastroides*, Turcz.) ; N.O., Myrtaceæ, B.Fl., iii., 211.

This is a " Mallee," also sometimes known as a " Desert Gum."

Wood hard, heavy, and close in the grain, of a yellowish-grey colour, tough, and durable. The Mallees are, however, too small to be useful as timber trees.

Forms, with other species of Eucalyptus, the Mallee country of Victoria, New South Wales, Queensland and South-western Australia.

281. **Eucalyptus Gunnii**, *Hook. f.*, (Syn. *E. ligustrina*, Miq.; *E. acervula*, Hook., f.); N.O., Myrtaceæ, B.Fl., iii., 246.

In Tasmania this is known as "Cider Gum," and in South-eastern Australia occasionally as the "Sugar Gum." In the same part it is known as "White Gum," "Swamp Gum," or "White Swamp Gum," and in the Noarlunga and Rapid Bay districts of South Australia as "Bastard White Gum." Occasionally it is known as "Yellow Gum." Near Bombala, New South Wales, two varieties go by the name of "Flooded," or "Bastard Gum," and "Red Gum."

The sweetish sap (see "Foods") of this tree is better known than its timber. "This tree is of too crooked a growth to be available as a timber tree to any great extent, and its average height is only about thirty feet in South Australia. The wood is hard and of good weight, but it is looked upon by the splitter as of very poor quality for general utilitarian purposes. For posts and underground work the timber is worthless. It, however, makes excellent charcoal." (J. E. Brown.) In the extreme south of New South Wales, the variety called "Flooded Gum," or "Bastard Gum," has a timber which is considered brittle, and is not used. The variety called "Red Gum" is, however, considered by most people in the neighbourhood to be the very best for standing underground, and is therefore preferred to any other for posts and piles, and especially for house blocks. It is also used for fencing, slabs, etc. This timber is rather hard to cut, and has a reddish colour, and, therefore, it is just possible that it may have been confused with the ordinary "Red Gum" (*E. rostrata*), whose durable properties are well known. The "Flooded Gum" occurs near creeks and swampy places, and the trunk is apt to branch out at no great altitude from the ground; the "Red Gum" (*E. Gunnii*) grows in higher and drier situations, runs up to a pretty high straight trunk, and the timber is hard to cut and darker in colour than the former.

A specimen of timber ("Swamp Gum") of this species, from Victoria, in the Technological Museum, is tough, of a light reddish-brown colour, and has a few gum-veins.

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. Gunnii*, var. (Swamp Gum), by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.12	.75	2327	1745	.950	.802
.14	.75	2268	1701	1.021	.842

Exceptionally attains a height of 250ft., usually much less.

Tasmania, the extreme south-eastern portion of South Australia, thence to Gippsland, and into New South Wales as far as Berrima.

282. **Eucalyptus hæmastoma,** *Smith*, (Syn. *E. signata*, F.v.M.; *E. falcifolia*, Miq.; and including *E. micrantha*, DC.); N.O., Myrtaceæ, B.Fl., iii., 212.

This is a "Spotted Gum," and "White Gum" of New South Wales and Queensland. About Sydney it is occasionally called "Blue Gum." As its white bark usually shows the serpentine marks of a boring insect, it is often called "Scribbly Gum." In the Illawarra district (New South Wales) it goes by the name of "Black-butt," and in the county of Camden, in the same colony, it is sometimes known as "Mountain Ash." In the extreme south a variety sometimes goes by the name of "Rough," or "Small-leaved Stringybark." Some Queensland aborigines know it by the name of "Kurra-gurra." A variety *(micrantha)* goes under the name of "Brittle Gum" in the Queanbeyan district, New South Wales.

The wood is of a grey or reddish colour, and not durable if exposed. It is considered the most worthless of the Queensland Eucalypts. While it is apt soon to decay, it furnishes a fair fuel, and material for rough carpentry. It also has some limited use for ship-building and wheelwrights' work.

Mr. Bäuerlen's opinion (the result of special enquiry) is a little more favourable. Writing from Colombo, Candelo, N.S.W., he says: "Timber second, or almost equal to *E. melliodora* in usefulness. Used for slabs and fencing purposes." Mr. H. Deane

"SPOTTED GUM," *(E. hæmastoma)* EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Local Name.	Botanical Name.	Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.
Spotted Gum.	*Eucalyptus hæmastoma.*	Queensland.	Seasoned at least twelve months	28/1/84	12	11.75	68.75	1.101	8.0.4	833.3	3	2.91	2275
				31/1/84	$11\frac{3}{4}$				6.3.24		$2\frac{3}{4}$		
				4/2/84	$11\frac{1}{2}$				7.1.8		3		

describes it as a short-grained, brittle, reddish wood, and states that the variety *micrantha* (which perhaps should be restored to specific rank) is called "Brittle Gum" for obvious reasons.

The following specimen of timber in the Technological Museum I have little hesitation in referring to this species. It was collected for the Exhibition of 1862, and bore the number 30, a piece of the same timber bearing the number 163 in the collection for the Paris Exhibition of 1855. It is called "White Gum," and bore the aboriginal names "Caarambuy" and "Calang-arra." It was from a tree 24 to 40in. in diameter, and 60 to 80ft. in height. It is described as "not much valued, being generally of crooked growth." It is beautiful to work; has a close, smooth grain, and a dark wavy, stripy red colour, almost like a she-oak in pattern.

Diameter, 24 to 28in.; height, 60 to 120ft.

Illawarra (New South Wales) to Wide Bay (Queensland).

283. **Eucalyptus hemiphloia,** *F.v.M.*, (Syn. *E. albens*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 216.

This is a common "Box" of New South Wales and Queensland. In the latter colony it often goes by the name of "Yellow Box." Other colonial names are "Canary Wood," "Grey Box," "White Box," and "Gum-topped Box." About Sydney it is called "White Gum." By the aboriginals of sub-tropical Eastern Australia it is known as "Narulgun."

An excellent timber, famous for its hardness, toughness, and durability. (Hill.) It is remarkably heavy, yellow-white in colour, of great lateral strength, and is used for such purposes as railway sleepers, naves, felloes, scantlings, jetty and bridge piles, plankings, mining slabs, and fence posts. A great drawback to this tree is its tendency to become hollow at a comparatively early age. (J. E. Brown.) It is largely used by coachmakers and wheelwrights for the naves of wheels and heavy framing; and by wheelwrights for the cogs of wheels. It is employed in ship-building, and forms one of the best materials for treenails, and for working into large screws. It is pale, strong, hard, of close and interlocked grain, and not fissile. It is useful for such articles as mauls and handles, which need toughness of wood for their manufacture.

"CANARY WOOD" (*E. hemiphloia*) EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Dimension of Tress.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.
Queensland	Seasoned at least twelve months.	About 2ft. diameter.	31/1/84 31/1/84	8 8½	8.25	48.27	0.773	8.3.22 8.2.8	981.0	3¾ 4½	4.12	2578

It is subject to destruction by white ants and dry rot when standing long in the ground.

Mr. Allen Ransome tested a sample of this wood sent from Victoria to the Colonial and Indian Exhibition. "During the trials a sleeper was adzed and bored; but for boring especially, the wood seems very hard. A panel was also passed through the planing-machine, but, owing to the sample being very cross-grained, the results were not good."

The Rev. Dr. Woolls points out that this species is indicative of good grazing country.

I have assumed that the "Box" timber tested by Captain Ward (Sydney Mint Experiments, 1858) belongs to this species. It came from Singleton. Specific gravity, 1.230; value of E, 538,800; of S, 2,445.

A specimen called "White Box," or "Grey Box," from Victoria, in the Museum, is hard and tough, of very close grain, and of a brown colour. A sample of timber (No. 10, London Exhibition of 1862, and No. 102, Paris Exhibition of 1855) is in this Museum, and very probably belongs to this species. It is a light buff coloured timber, heavy, very hard, tough, and durable. In the catalogue it is called "Illawarra Box," and its aboriginal name is given as "Gnooroo-warra." Height, 120 to 180ft.; diameter, 48 to 72in., and described as "a tree with magnificent timber, of first-rate quality for size, hardness, toughness and durability."

Diameter, 20 to 40in.; height, 50 to 60ft.

Eastern South Australia, Victoria, New South Wales and Southern Queensland.

284. **Eucalyptus largiflorens**, *F.v.M.*, (Syn. *E. pendula*, A. Cunn.,
wi *E. bicolor*, A. Cunn. (the name of the species in B.Fl.); *E.*
wrigl *hæmastoma*, Miq. non Smith); N.O., Myrtaceæ, B.Fl., iii.,
and fo 214.
into lar This tree bears the names of "Cooburn," "Box," "Black Box,"
grain, and Box," "Bastard Box" (workmen supposing it to be a cross
handles, whi ox" and "Grey Gum"), "Grey Box," and "Ironbark." It is
Slaty Gum," from the grey and white patches on the bark.

This timber is hard, tough, and durable, very lasting underground, and of a red colour. It is used for fencing, rough buildings, and sleepers, also for shafts, poles, and cogs. It is more easily worked than the generality of Ironbarks. The large trees are frequently hollow and decayed at heart. Diameter, 24 to 36in.; height, 100 to 120ft.

South Australia, round Eastern Australia to the Gulf of Carpentaria.

285. **Eucalyptus leucoxylon,** *F.v.M.*, (Syn. *E. sideroxylon*, A. Cunn.), (see p. 473); N.O., Myrtaceæ, B.Fl., iii., 209.

Common "Ironbark." It is occasionally known as "Black Ironbark," and from Sydney to the Blue Mountains as "Red Ironbark," or "Red-flowering Ironbark" *(E. sideroxylon)*. In the neighbourhood of Twofold Bay (New South Wales) it is called "Black Mountain Ash." In South Australia it has the following names:—"White Gum," "Blue Gum," "Bastard Blue Gum," "Scribbly Blue Gum." It occasionally boasts the ridiculous name of "Fat Cake." By the aboriginals of Gippsland it is known as "Yerrick." It was called "Easip" by the aboriginals of the Yarra (Victoria).

Important Note.—E. leucoxylon, F.v.M. The "Blue or White Gum" of South Australia and Victoria is a gum-tree with smooth bark and light-coloured wood (hence the specific name). The flowers and fruit of *E. leucoxylon* (compare figure in Brown's *Forest Flora of South Australia)* are very similar to those of *E. sideroxylon*, and in this way two trees have been placed under one name which are really quite distinct. Baron Mueller points out *(Eucalyptographia)* that there are two well-marked varieties of *E. leucoxylon* in Victoria. That known as "White Gum" has the greater portion of the stem pale and smooth through the outer layers of the bark falling off. The variety known chiefly as the "Victorian Ironbark," and mostly growing on stony ridges or mountains of the lower Silurian sandstone and slate formation, retains the whole bark on the stem, it thus becoming deeply fissured and furrowed, and very hard and dark coloured. But this rugged-barked variety must not be confused with the "Red-flowering Ironbark" *(E. sideroxylon)* of New South Wales. The individual Victorian trees with rugged bark round the butt are probably few, and a mere variety.

A little confusion has arisen in descriptions of different kinds of timber under this species, but the author has endeavoured to allot them correctly to *E. leucoxylon*, F.v.M., and *E. sideroxylon*, A. Cunn.

E. leucoxylon, F.v.M. The wood of this tree is of a very superior class. It is very durable, possesses great lateral strength, and when dry is hard and tough; in colour, it is yellowish-white or pale pinkish-white. Amongst the more important purposes to which it is applied may be enumerated railway sleepers, bridge-piles and planking, jetty planking, naves and felloes of wheels, waggon shafts, telegraph poles, axe handles, bullock yokes, fencing posts, beams and rafters of buildings, and slabs for mining operations. The weight of air-dried wood varies from 63½ to 71lbs. per cubic foot; it yields 28 per cent. of superior charcoal, 45 per cent. of crude wood-spirit, and 6 per cent. of tar. (Mueller.) Builders call this wood close and straight-grained, and slightly greasy, but this latter property makes it serviceable to the millwright for the cogs of heavy wheels.

It is called "Box" in the *Report, Victorian Exh.*, 1861, and the following statement is made concerning it: "This is of a light colour and a greasy nature, remarkable for the hardness and closeness of its grain, its great strength and tenacity, and its durability both in the water and when placed in the ground. It is largely used by coachmakers and wheelwrights for the naves of wheels and for heavy framing; and by millwrights for the cogs of their wheels. In ship-building it has numerous and important applications, and forms one of the best materials for treenails, and for working into large screws in this and other mechanical arts." A sample, sent from South Australia to the Colonial and Indian Exhibition, was thus reported on by Mr. Allen Ransome: "A sleeper was experimented on in the adzing and boring machine with highly satisfactory results, and boards passed through the planing machine left the cutters with an excellent surface."

This species has succeeded admirably at Abbotabad, Punjab, India. (Gamble.)

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. leucoxylon*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{L\ W}{4BD^2}$	Specific gravity.	
With the Apparatus weighing 780lbs.	At the crisis of breaking.			Air dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.03	.63	4192	3144	1.028	.908
.03	.60	3977	2983	1.061	.913

E. sideroxylon, A. Cunn.* The "Red-flowering Ironbark" of New South Wales, occurring in the bush between Parramatta and Liverpool, in paddocks at South Creek, and in the neighbourhood of Richmond, and again beyond the Blue Mountains, near Mudgee, and Wellington, and elsewhere, being widely diffused over the auriferous districts of the western interior. The bark is dark, and deeply furrowed, and the wood is of a deeper colour than that of any other Ironbark. It has been made by Baron Mueller *(Eucalyptographia)* a synonym of *E. leucoxylon* (see p. 471), and, perhaps against his better judgment (but as a matter of convenience in describing the two timbers), the author has accepted this arrangement in the present work.

E. sideroxylon, A. Cunn. This tree has a straight even bole; the timber is of the highest reputation for strength and durability, and is very much used for large beams in stores for heavy goods, poles for bullock drays, railway sleepers, girders and piles for bridges, and other purposes where great strength is required. It is one of the best fuel woods of New South Wales for domestic uses and steam engines. Its average weight is from 75 to 78lb. per cubic foot when green, and it loses 3 to 5lb. in drying within the first two years. *(General Report, Sydney International Exhibition,* 1879.)

E. sideroxylon is described as follows in the *Report, Victorian Exhibition*, 1861 :—"'Ironbark.' This is one of the hardest and

* See Woolls, *Plants of New South Wales.*

heaviest of our native woods, and has a peculiarly thick and rugged bark, with deep longitudinal fissures, which is very characteristic. It possesses great strength and tenacity, and has a close and straight grain, on which account it is highly useful to the coachmaker and wheelwright for the poles and shafts of carriages, and the spokes of wheels. Its greasy nature also renders this wood very serviceable to the millwright for the cogs of heavy wheels. It is also valuable for many purposes in ship-building, and constitutes one of the most imperishable of our timbers."

Following are brief descriptions of timbers of this species in the Technological Museum of Sydney :—" Red-flowering Ironbark," or " Black Ironbark :"* Of very dark red colour, close in the grain, and fairly good to work. A useful wood where strength is required. It is very heavy and hard. (Victoria.) *(Cat. Timbers, Technological Museum, Melbourne.)* " Red Ironbark :" Diameter, 2ft. Colour, dark reddish-brown, full of shakes, very heavy, and difficult to dress. (Eastern N.S.W.) " Red Ironbark :" Diameter, 2ft. Colour, rich red. Shelling in concentric layers near the heart, and full of shakes. Very difficult to dress. (New South Wales.) " Red Ironbark :" Diameter, 2ft. Colour, brown. Full of shakes ; works fairly well, splits tolerably freely. (New South Wales.) The last two samples have been cut at the wrong season.

The three following timbers (also in the Technological Museum) must also be referred to this species :—1. No. 3 (*Lond.*, 1862) ; No. 90 (*Paris*, 1855). " Ironbark" of Illawarra, and " Barremma " of the aboriginals. Diameter, 36 to 60in.; height, 80 to 130ft. " Of the highest reputation for strength and durability." It is of a dark red colour, figured in stripes, heavy, tough, hard, and difficult to work, strong, and very durable. 2. No. 5 (*Lond.*, 1862); No. 137*b* (*Paris*, 1855), from Appin, New South Wales. It is of a dirty streaky-brown colour, very heavy, cross-grained, and tough, and not very good to work. 3. No. 6 (*Lond.*, 1862); 137*c* (*Paris*, 1855), from the upper part of the Bargo Brush. Diameter, 24 to 36in.; height, 60 to 80ft.

* This specimen was received from Victoria, labelled *E. sideroxylon*, and with the vernacular names given. Yet it cannot be the New South Wales species.

TIMBER EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Botanical Name.	Locality Where Grown.	Approximate Date when the Timber was Cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Trees grew.	Elevation above Sea-level.
Eucalyptus leucoxylon, F.v.M., *Eucalyptus sideroxylon* A. Cunn. (See p. 471)	Toongabbie, Gippsland.	1872	24/4/84	$13\frac{1}{4}$	12.52	73.26	1.173	9.0.26	951.67	4	4.44	2598	Lower Palæozoic.	A few hundred feet.
			24/4/84	13				8.2.26		$4\frac{3}{8}$				
			24/4/84	$12\frac{3}{8}$				8.0.24		4				
			24/4/84	12				8.3.0		$5\frac{1}{2}$				
			24/4/84	$12\frac{3}{8}$				8.1.20		5				
			24/4/84	$12\frac{1}{8}$				7.2.14		$3\frac{3}{4}$				

With the exception that it is a shade darker, it cannot be distinguished from the preceding.

This species is, with very little doubt, the timber experimented upon in the Sydney Mint experiments under the name of "Red Ironbark." It is described as hard, close-grained, of great strength and durability, and valuable for ship-building, engineering works, etc. It is said, however, to be readily attacked by the white ant. The specimens came from Berrima, New South Wales, the tree was 30ft. to the fork, and 30in. in diameter. Specific gravity, 1.167; value of E, 521,300; of S, 3951. In the same experiments the "Smooth-barked Ironbark," from Brisbane, must be from this species, as the wood displays no important differences from authenticated specimens. It is described as "A strong and durable timber, and well-adapted for building purposes, shingling, etc." The tree was 35ft. to the fork, and 25in. in diameter. Specific gravity, 1.176; value of E, 604.800; of S, 2898.

Height, up to 200ft., but this is exceptional.

Spencer's Gulf (South Australia), through Victoria and New South Wales to Southern Queensland.

286. **Eucalyptus longifolia,** *Link*, (Syn. *E. Woollsii*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 226.

This tree commonly bears the names of "Woolly Butt" and "Bastard Box," but usually the former.

This wood is in request for fuel, but is not much valued as a timber because of its gum-veins. When sound, it is sought after for wheelwrights' work. (Sir W. Macarthur.) Other authorities have referred to its durability for fences. Posts are said to have remained undecayed in the ground for twenty years. It is used for felloes, shafts, spokes, agricultural implements, house-building, etc. Its specific gravity is 1.187, the weight of a cubic foot of dried wood being 68½lb.

The following four samples are in the Technological Museum. They are all called "Woolly Butt;" the first is from Victoria, the others from New South Wales :—

1. Very light colour; close in the grain; has gum veins; works easily. 2. Called also "Bastard Box." Diameter, 2ft. Light red; full of shakes; a few gum-veins; bad to work. (S. districts.) 3. Diameter, 15in. Dark red; fairly sound; good to work. (Shoalhaven.) 4. No. 24 (London, 1862); 89 (Paris, 1855). "Gnaoulie" of the Illawarra aboriginals. Diameter, 36 to 72in.; height, 100 to 150ft. "A very large and fine timber tree, its wood much prized for felloes of wheels and other work requiring strength and toughness."

Diameter, 36 to 48in.; height, 100 to 130ft.

Victoria, New South Wales, not much farther north than Port Jackson.

287. **Eucalyptus macrocarpa,** *Hook.*, N.O., Myrtaceæ, B.Fl., iii., 224.

"Morrel."

Some spokes of this wood were exhibited at the Intercolonial Exhibition of Melbourne, 1886. It is also used for shafts and such purposes.

Western Australia.

288. **Eucalyptus macrorrhyncha,** *F.v.M.*, (Syn. *E. acervula*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 207.

The ordinary "Stringybark" of Victoria and New South Wales. It is the "Ironbark" of the McAlister River (Victoria). It shares the Gippsland aboriginal name of "Yangoora" with *E. capitellata.*

A tall tree. The wood is hard and mostly tinged with a deeper red-brownish colouration, but occurs also pale-coloured; it is durable and easily fissile into fence-rails, shingles, and palings, and is very useful for all purposes for which rough split timber is required above ground; it is also sawn into weather-boards and scantlings, and furnishes a fair fuel. The specific gravity of the seasoned wood is about 1.020, or 63½lbs. to the cubic foot. (Mueller.) A sample from the Monaro, New South Wales, is an excellent furniture wood, being light, strong, and close-grained, and capable of a good polish. It is, however, chiefly used for fencing and wheelwrights' work in Southern New

South Wales. A Victorian specimen in the Museum is figured in stripes of a yellow and brown colour, and is close-grained.

I do not doubt that the following specimens (also in the Museum) belong to this species:—

No. 48 (Lond., 1862); 124 (Paris, 1855), Camden "Stringybark;" called "Bour-rougne" by the Camden aboriginals. Diameter, 24 to 54in.; height, 50 to 100ft. "A species yielding timber much prized for flooring-boards and house-carpentry, of considerable strength and durability; differs from the stringybark of the coast." One sample is of a light-brown colour, and of a tough nature. It tears up a good deal under the plane. The second sample appears in no way altered or different to the first. It is part of a post placed in the ground in 1815, and dug up in 1861; certified to by the late Sir William Macarthur.

Some specimens of this timber were tested by Mr. F. A. Campbell (*Proc. R.S., Victoria*, 1879) for tensile strength. His figures (lbs. per square in.) are 23,000, 23,400, and 20,000. An inferior piece broke at 11,700. The specimens broke with a very long fracture.

It is probable that the "Stringybark" timber tested by Captain Ward (Sydney Mint experiments, 1858) belongs to this species. It came from Singleton, New South Wales. Specific gravity, .937; value of E, 343900; of S, 1818.

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. macrorrhyncha*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lbs.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.17	.62	2412	1809	.952	.809
.17	.60	2384	1788	1.060	.901

South Australia, Victoria and Southern New South Wales.

289. **Eucalyptus maculata,** *Hook.*, (Syn. *E. variegata*, F.v.M.; *E. peltata*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 254 and 258.

"Spotted Gum."

There is great demand for this timber, which is used for ship-building, bridges, girders, naves of wheels, cart and buggy shafts, cubes for street paving, staves, shingles, and general building purposes, where a strong, close-grained, and durable timber is required. Baron Mueller, however, points out that it seems to vary in quality according to the locality in which it grows. It is the coarsest-grained timber of the Eucalypts, and the timber is very readily recognised. A sample of wood of this species from eastern New South Wales may be thus described: Dark yellow; contains large gum-veins, and is inclined to split. The figure has a very pretty wavy appearance, which extends from the heart to the sap. Diameter, 2ft.

The Rev. J. E. Tenison-Woods points out that the Queensland Government will not allow this timber to be used for telegraph poles.

At the London International Exhibition of 1862, a piece of this timber from the hull of the steamer *William IV.* was exhibited. With the exception of some slight charring on the mere surface of the timber in the immediate vicinity of the boilers, the entire fabric of this vessel is as substantial and sound as when she was built in the year 1830.

There is no doubt that the "Spotted Gum" timber of Captain Ward's Sydney Mint Experiments (1858) belongs to this species. Specific gravity, 1.035; value of E, 485,500; of S, 2006. There is also in the Museum a specimen originally labelled *E. goniocalyx* (Spotted Gum), a sample of which was tested in the Mint Experiments of 1861 (p. 12). It has a specific gravity of 1.17; value of E, 574,500; of S, 2604. It is stated to be a "timber of great strength and durability in dry situations, but not much prized." It came from Brisbane. It is a heavy timber, cross-grained, tough to work, brown, inclining to walnut, and with but little figure. The author has no doubt the timber is the produce of *E. maculata*, which is also vernacularly known as "Spotted Gum."

Diameter, 36 to 48in. (in parts of Southern New South Wales its diameter reaches to 6 or 8ft.); height, 100 to 150ft.

Southern New South Wales to Central Queensland.

290. **Eucalyptus maculata,** var. **citriodora,** *Hook. f.*, (Syn. *E. citriodora*, Hook. f.; *E. melissiodora*, Lindl.); N.O., Myrtaceæ, B.Fl., iii., 257.

The "Citron," or "Lemon-scented Gum," so called from the delicious odour of its leaves. An aboriginal name is "Urara," while another is "Kangar."

Timber hard and durable, used for house-carpentry. (Hill.) It is used for studs, which, after twenty years, show no sign of decay; it is furthermore liked for fences, as it splits well, also for the shafts of drays, as it is more pliable than most other Eucalyptus timber, and it is also used for wheels. (F. Kilner.) Captain E. W. Ward gives its specific gravity as .942, on an average of four experiments. Diameter, 18 to 34in.; height, 40 to 70ft.

Queensland.

291. **Eucalyptus marginata,** *Smith*, (Syn. *E. floribunda*, Huegel; *E. hypoleuca*, Schau.; *E. Mahagoni*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 209.

Universally known as "Jarrah." In Western Australia it also bears the name of "Mahogany," or "Bastard Mahogany." The aboriginal name is "Jerrile."

(N.B.—Under *E. diversicolor* will be found a table of comparative experiments with that timber, *E. marginata*, *E. gomphocephala*, English Oak, and Indian Teak.)

At the London International Exhibition of 1867 there were exhibited two piles of a bridge made of this timber, which had

Foot Note.—In Brandis' *Forest Flora of North-West and Central India* occurs the following passage:—"The *Yarrah* wood of Western Australia (*E. rostrata*, Schlecht) is a very strong and durable wood, but apt to crack and split unless thoroughly seasoned. It is said to resist white ants and the *Teredo navalis*, and has been imported to India for railway sleepers." Dr. Brandis has obviously confused *Jarrah* (*E. marginata*, Smith) with *Yarrah* (*E. rostrata*, Schlecht). I notice that Dr. J. E. Taylor, in his book *Our Island Continent*, has fallen into the same error. It may just be mentioned that the word *Jarrah*, as an equivalent for the timber of *E. marginata*, is in universal use throughout Australia, while *Yarrah* (*E. rostrata*) is scarcely, if ever, used but by some interior aboriginals.

been exposed for seventeen years in water and sand, and of which the morticed ends were wholly untouched by any signs of decay; also a noble burr of the same tree, five feet across and seven inches thick. There was also exhibited a pile ten feet long by six thick, that had formed part of a jetty built in 1832, and removed in 1861. Neither sap-wood nor heart-wood was injured by the *Teredo*,* which had attempted in vain to bore into it. In the Western Australian Court at the Colonial and Indian Exhibition, 1886, there was shown a pile of Jarrah which had been between wind and tide for forty-two years. It is not perfectly impervious to the *Teredo*, it is true, but that pest had only got as far as the sap.

"Open to air and weather, on wind and water-line, under the soil or submerged, it is not materially effected, remaining intact after nearly fifty years' trial. The choicest timber is obtained from the summit of the granite and ironstone ranges; trees grown on sandy plains near the sea yield a timber of inferior quality, twisted, also shorter in the grain, and much less durable." (H. E. Victor.) "Without sheathing or other protection it has proved sound and enduring to an extent which appears to denote exemption from decay, so far as evidence can be obtained from observation of timber exposed for upwards of thirty years. I have recently taken up piles, which were driven for a whaling jetty in the year 1834 or 1835; the timber is small but perfectly free from boring marine mollusca, although the place is swarming with *Teredo*. In the old jetty-work at the port of Fremantle, piles which had been driven for thirty years, and others only about one year, could scarcely be distinguished, both being equally sound; large iron-bolts through them have entirely corroded away, leaving the holes clean and sound. Round piles with only their bark peeled off, driven before seasoning, appear to stand as well as those which were squared and seasoned. Young, as well as matured, wood had effectually resisted the attack of boring sea-worms and crustacea. A cargo-boat, upwards of twenty years old, exposed all the time, and as often high and dry as afloat, is as sound as when it was launched. Coasting craft,

* The *Teredo navalis* bores wood below low-water mark. It always travels in the direction of the grain, unless it meets another *teredo*.

which had been more than ten years afloat without copper sheathing, are perfectly seaworthy, not a plank perforated, nor a butt end rotten. A sapling pole, which had been set up to mark a shoal near Fremantle, sheathed with copper and guyed with iron chains, was found on inspection to be uninjured after twenty years' exposure; a chip of it was taken from the water line with a pocket-knife, and it looked like cedar, but the copper-sheathing and iron chains had both perished. Land boundary posts, put in forty years since, show neither weathering nor rot, nor injury from *Termites;* letters cut on them are still clean and sharp. This is the case also with slabs in the cemetery at Perth, bearing inscriptions dating as far back at 1834. Flooring of cottages, wet and dry according to the season, laid on the ground without joists, after twenty-five years shows no signs of decay on either side. As Jarrah has been the timber used throughout the colony of Western Australia since its foundation in 1829, there are numerous examples to refer to, proving its durability. Properly cut and properly dried, the material would prove in practice as durable as iron, and under some circumstances would outlive it. The time occupied in drying ought to be one month for every inch of thickness, if the timber is sawn or hewn; but if round it requires only to be banded at the ends to prevent splitting. In the forests any number of trees can be selected to suit particular purposes for which the timber may be required, either for round piles or squared logs, so also for railway-sleepers, while for furniture special selections would be necessary; in the latter case splendid specimens can be obtained exhibiting a ray of light across the grain with a variety of mottles and lines when polished highly to give a very pleasing effect, though the wood is too heavy for any but massive designs. Some of the protuberances from the trunks and branches are of an immense size, and furnish slabs rivalling in beauty the finest specimens of walnut or pollard-oak; they require, however, a good deal of time in seasoning before they can be made up, after being cut into slabs; it is not unusual to find such protuberances from 6 to 10ft. in diameter. I have drawn attention more particularly to timber intended for heavy works, such as sea-facing, dock-lining, foundations, and bed-blocks for machinery. It is, however,

equally suitable for all building purposes, framing, quartering, weather-boarding, planking, flooring, ceilings, balusters, railings, and fencing; it forms also durable cross-cut blocks for roadways and paths, easily laid and bedded in common sand. The specific gravity of the timber averages about 1.12; if well-dried, small scantlings will float in the sea, but when saturated will sink. Specimens direct from the mill weigh from 71 to 76lb. per cubic foot." *(Report of Clerk of Public Works, Fremantle, Western Australia.)*

The following additional remarks are taken from the same Report:—

"The purposes to which Jarrah timber may be applied are innumerable; it fills the place where sal (*Shorea robusta*) and teak could not be admitted, as well as where they are used; and as the material can be supplied at a price somewhat less than the timbers named, in the log, and at half their price in scantling, it should be employed where hitherto timber has been considered undesirable; for instance in sea-facing. . . . As a substitute for the roofing usually constructed in India, I believe shingling with Jarrah only requires to be known to be appreciated. At a distance these shingles might be mistaken for grey slates, they lie so close and regularly; thin as they are, they make a remarkably cool roof, and when once set require little or no repairs for years. I have seen here, where many roofs are of this material, houses that have not cost £1 in roof repairs for 25 years. They are water-tight in the heaviest downpour, and are not shifted in a hurricane. Their lightness admits of a considerable saving in the roof-framing. The saw-bench room at the Rockingham Mills is 32ft. span. The heaviest timbers are only 6 x 2, the rafters 18in. apart, and the principals 6ft. With all these advantages, the shingles do not readily catch fire; burning charcoal thrown on them chars a hole, but does not inflame them. It is one of the most uninflammable timbers I am acquainted with. The shingles, as supplied from the mills are 24 x 4 x ¼in., weight less than 1lb. each, are laid with an overlap of 16in., run about 450 to a square, are hung with French wire nails on sawn battens, the pitch of the roof being 45 degrees."

Professor Abel made an analysis of Jarrah timber, and as this analysis is often referred to in different pamphlets on the subject, I give it *in extenso* :—

"In accordance with instructions received, I have made a qualitative analysis of certain specimens of Jarrah, with the view of obtaining from its chemical composition actual proof of the principle which renders the timber impervious to the action of dry rot, and proof against the action of *Teredo navalis* and the white ant. I find that the duramen contains from 16 to 20 per cent. of an astringent gum somewhat resembling the gum-kino of commerce, sparingly soluble in alcohol, but completely so in boiling distilled water. Upon further analysis, this gum was found to consist almost entirely of colouring matter and a highly astringent vegetable acid, which may be called "Jarrah-tannic acid," inasmuch as it possesses some of the characteristics of tannic-acid, together with other relations peculiar to itself.

"I have failed to discover an alkaloid or organic base (although several different processes have been adopted), since, after the separation of the gum, albumen and colouring matter, I obtain nothing more than traces of saccharose and glucose with fatty matter, which in the present enquiry are of little or no importance. It is, therefore, evident that the active principle of the Jarrah is the powerfully astringent acid, which, uncombined with any base, is suspended in the gum, and thereby uniformly diffused throughout the tissues of the wood in a thin section, of which innumerable translucent particles of the gum may be seen by the aid of a small convex lens."

Bearing in mind the almost unanimous opinion as to the immunity of Jarrah from attacks by the *Teredo navalis*, one is inclined to think that the writer of the following (from Port Darwin) must have been mistaken as to the Eucalyptus timber of which the piles to which he refers were made :—

"It would appear that the Jarrah is just as susceptible to the attacks of Cobra (*Teredo navalis* or ? *Calobates sp.*) in water as it is to those of white ants on shore. The *Whampoa*, on her southern trip, took down a piece cut from one of the trial piles of the jetty (Port Darwin), planted some months ago, which was

thoroughly perforated by the sea-worm." (Port Darwin correspondent of *Tropical Agriculturalist*, Sept., 1885.)

However, in regard to the timber which formed the subject of the following report, it is not possible that any mistake such as hinted at in the previous case could have been made.

In the year 1876 there was presented a "Report from the Engineer of the Auckland Harbour Board upon experiments he has made with Jarrah, to see whether it is really proof against the attacks of the Teredo (mollusc) which inhabit Auckland waters." I make the following extracts from the report (which is by Mr. D. E. Macdonald, A.M.I.C.E.) :—

"On the 3rd July, 1874, I obtained two squared logs of Jarrah timber from Messrs. Danaher and Lanigan, contractors for the Mangere bridge. This structure spans the Manukau, and is erected on Jarrah piles specially selected by Mr. Danaher, who visited Western Australia for that purpose. One of these logs I had sawn into pieces of scantling, 6 x 3, and spiked to the totara piles of the Queen-street wharf. A few days since I had two of these pieces taken up, and found that although they had only been in the water for twenty-one months, the teredines were carrying on their destructive operations. (Specimens submitted, Nos. 1 and 2.) I made an examination of the Jarrah used in the Mangere Bridge, and regret having to state that the piles and lower headstocks have been attacked by the teredo in the most determined manner, and from their large growth fear that it will be found necessary ere long to replace the whole of the piles. (Specimens No. A, B, C, were taken from No. 1, 9, and 19 row or bay of piles. Specimen D was taken from a Jarrah 9 x 3 plank, found on the mud on the upper side of the bridge.) It is about two years since these piles were driven."

On July 6th, 1880, Mr. Macdonald reports:—"With my report under date 29th March, 1876, I submitted specimens No. A, B, and C, of Jarrah timber taken from the piles of the Mangere Bridge, and stated 'that it will be found necessary ere long to replace the whole of the piles.' I have now to state that a contract has been let by the General Government for replacing the whole of the Jarrah piles with Totara." With this report Mr. Macdonald

submitted pieces of the Jarrah piles which had been in use sixteen years, but he left them to speak for themselves, as the extent of the injury they suffered from the *teredo* is not specified by him in the papers.

The following lengthy account by Laslett of Jarrah is of deep interest, inasmuch as it has doubtless had considerable influence in forming the opinions of English officials and others as to the value of the timber. It must, however, be borne in mind that Laslett's account was published so long back as 1875, and that, on account of the Western Australian Government never losing an opportunity of bringing the merits of this timber before the world, far more data are now at our service for assessing its proper value.

"It is of straight growth and very large dimensions, but unfortunately is liable to early decay in the centre. The sound trees, however, yield solid and useful timber of from 20 to 40ft. in length by 11 to 24in. square, while those with faulty centres furnish only indifferent squares of smaller sizes, or pieces unequally sided, called flitches.

"The wood is red in colour, hard, heavy, close in texture, slightly wavy in the grain, and with occasionally enough figure to give it value for ornamental purposes; it works up quite smoothly, and takes a good polish. Cabinet-makers may, therefore, readily employ it for furniture, but for architectural, and other works where great strength is required, it should be used with caution, as the experiments prove it to be somewhat brittle in character. Some few years since a small-supply of this wood was sent to Woolwich Dockyard, with the view to test its quality and fitness for employment in ship-building, but the sample did not turn out well, owing to the want of care in the selection of the proper wood in the colony. The shipping officer sent only such small squares as might have been produced from logs cut or quartered longitudinally, which left in each case one weak or shaky angle, instead of sending the full-sized compact square log representing all that the growth of the tree would give. It is just possible, however, that this was unavoidable, since it may be inferred from the nature of the conversions that the trees from which they were cut com-

menced to decay at the centre at or about mid-life, and they had become hollow at the root-end of the stem long before they arrived at maturity. This remarkable defect being characteristic of the Jarrah tree, it follows that no compact and solid square log beyond the medium size can be obtained of the full growth, and hence the conversion of the faulty trees is necessarily restricted to the dimensions of the flitches cut clear of the centre. One peculiarity was noticed in the sample referred to; some of the logs had cavities or blisters, varying from one to several inches in length in the longitudinal direction of the woody layers, and spreading from 1 to 2in. concentrically, which occurred like the cup-shake, at various distances from the pith, and at intervals of a few feet along the line of the trunk of the tree. These cavities were partially filled with a hard secretion of resin or gum. From what has been stated respecting the Jarrah timber received at Woolwich, it will readily be supposed that the authorities there did not look upon it with favour, or with any desire to employ it for ship-building purposes. It therefore passed to some of the minor services of the yard, and it was while under conversion for these ordinary and inferior works that I took the opportunity of making the experiments which are given in detail in the tables to follow.

It is a noticeable fact in connection with the experiments, that all the specimens tried proved deficient in strength and tenacity. by breaking off suddenly with a short fracture, under an average transverse strain of about 686lb. weight only, or about 171.5lb. to the square inch of sectional area. Since the foregoing was prepared, I have seen some correspondence between the Home and Colonial Governments on the subject of Jarrah timber, and also between the Governor of Western Australia and the leading ship-builders and ship-owners, including Lloyd's surveyor at Fremantle, who had been severally asked to report upon the merits of the Jarrah, with a view to getting it recognised at Lloyd's. Most of the ship-builders and ship-owners have reported very favourably, and speak of it as a good description of wood. They say that when used with iron fastenings, neither material is in any way injured by the other, and also what is a little remarkable, that it bends well without steaming. In speaking of its merits, however,

they nearly all do so under some reserve, such as insisting upon the felling being done at a certain time of the year; getting it from some particular district, and so forth. Lloyd's agent at Fremantle, however, does not report quite so favourably of it; indeed, he differs so widely from the rest, that perhaps it would be well to quote his report *in extenso*:—

"In reply to your letter relative to the qualities of the Jarrah of this country as a ship-building timber, I consider it valuable wood for planking purposes as high as the wales, and I also consider it especially excellent wood for small craft which are not intended to be sheathed with metal, inasmuch as it resists the sea-worm better than almost any other wood, and is less liable to foul; but I do not consider it suitable timber for top sides, or deck work, where it must necessarily be much exposed to the effects of the sun, it being, in such conditions, more than ordinarily subject to shrink and warp; and it is rather deficient in tenacity of fibre, so that in situations where eccentric or sudden bends occur it cannot generally be employed with advantage. It is probable you may have heard of the Honourable East India Company's pilot brig *Salween*, taking in a cargo of Jarrah at Bunbury. This was supplied by Mr. W. Pearce Clifton, and the vessel was sent at my instance in order to a series of trials of the wood in the Kidderpore Dockyard. These trials I regret to say were not favourable to the character of the wood, and the result was that no further supply was ordered. When last at Calcutta, I obtained the sanction of the Government of Bengal to further tests of the wood, the greater portion of the *Salween's* cargo being then still in store, but I am sorry to say that the result was not more favourable than before."

The Clerk of Works at Fremantle, reporting summarily upon the opinions expressed by the ship-builders and others, says:—"The sound timber resists the attack of the *Teredo navilis* and white ant. On analysis by Professor Abel it was found to contain a pungent acid that was fatal to life. The principle, however, was not found to be present in the unsound portion. Great care is therefore necessary in preparing wood for use by flitching the log so as to cut all the defective portions of the heart out, and using only the perfectly sound timber. Much has been said about Jarrah

being subject to split when exported to India or England in log. It must be borne in mind that its density renders seasoning very slow, and that the inner portions of the larger trees are in a state of decay while the outer portions are in full vigour. A tree under these conditions, the inner portions comparatively dry, and the outer full of sap, shipped at once to a hot climate like that of India, or to such a variable one as that of England, very naturally bursts from unequal shrinkage, being also exposed to very great changes of temperature. To obviate this peculiarity and apparent defect, let the Jarrah be fallen when the sap is at the lowest ebb, and flitched as previously suggested."

From the foregoing statements it will be seen that there is great diversity of opinion upon the merits of Jarrah timber, and time only will show whether, if imported, it will find favour with ship-builders and others in this country.

"Some three or four years since (about 1871) the Western Australian Timber Company were busily engaged in the forests preparing a large quantity of Jarrah for exportation. The company professes, I believe, to select only the best trees, and to cut them at the proper season; the deliveries should, therefore, be of the very best sort the country produces. I have earnestly looked for sample cargoes to arrive in the London Docks, but up to the present (1875) none of any importance has been reported." This does not remain true now. The price of the timber is frequently quoted in the hardwood list of the *Timber Trades' Journal*, and especially during the currency of the Colonial and Indian Exhibition, the shipments of Jarrah to England have been numerous.

A sample, sent to the Colonial and Indian Exhibition, was tested by Mr. Allen Ransome. He reported as follows:—"It is beautifully marked, and somewhat resembles mahogany in colour. Railway sleepers, joinery, casks, spokes, and hammer handles were made from it. The planed and moulded specimens, unlike the Karri, which does not finish well, left the machines with a remarkably fine surface."

Mr. R. C. Patterson states *(Proc. Inst. C.E.*, lvi., 39) that certain Jarrah sleepers, after having been in the ground in the South Australian railways for twelve years, were in as good condition

as when they were first laid. The sleepers were 6ft. 6in. long, 8in. wide, and 4in. deep, and sawn, but not split from the log. The seat for the rail was adzed by machinery on the ground.

TRANSVERSE EXPERIMENTS.

(Laslett.)

Number of the specimen.	Deflections. With the apparatus weighing 390lb.	Deflections. After the weight was removed.	Deflections. At the crisis of breaking.	Total Weight required to break each piece.	Specific gravity.	Weight reduced to specific gravity 1000.	Weight required to break one square inch.
	Inches.	Inch.	Inches.	Lb.			Lb.
1	2.85	.10	4.50	743	987	753	185.75
2	3.25	.15	4.50	638	1049	608	159.50
3	3.25	.15	5.00	661	977	677	165.25
4	3.50	.15	5.00	661	1039	636	165.25
5	3.15	.10	4.50	726	1006	722	181.50
6	3.25	.15	4.75	685	1002	684	171.25
Total	19.25	.80	28.25	4114	6060	4080	1028.50
Average	3.21	.133	4.71	685.60	1010	680	171.416

Samples 7ft. long. Each piece broke short.

TENSILE EXPERIMENTS.

(Laslett.)

Number of the specimen.	Dimensions of each piece.	Specific Gravity.	Weight the piece broke with.	Direct cohesion on 1 square inch.
	Inches.		Lbs.	Lbs.
7	2 x 2 x 30	987	10.080	2,520
8	2 x 2 x 30	1006	13,440	3,360
Total		1993	23,520	5,880
Average		996	11,760	2,940

Vertical or Crushing Strain on Cubes of Two Inches.

No. 9. Tons.	No. 10. Tons.	No. 11. Tons.	No. 12. Tons.	No. 13. Tons.	No. 14. Tons.	Total. Tons.	Average. Tons.	Ditto on square inch. Tons.
12.875	13.000	12.625	12.750	12.750	12.750	76.75	12.792	3.198

E = 296810. S = 1800.

"JARRAH" (*E. marginata*) EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.
Western Australia	Seasoned at least twelve months.	31/1/84	9½	9.33	54.36	0.875	0.870	7.0.10	837.3	725.1	3¾	3.71	4.09	1,982
		31/1/84	9½					7.3.0			3½			
		4/2/84	9					7.2.10			3¾			
Do		4/2/84	9	8.92		0.837		7.0.19	829.7		3½	4.00		
		4/2/84	8¾					7.1.14			4			
		4/2/84	9					7.2.20			4½			
Do.		24/1/84	10	9.80		0.918		6.2.25	744.8		3½	4.25		
		28/1/84	10					6.1.27			5			
		31/1/84	9¾					7.3.10			4½			
		7/2/84	9¾					6.2.0			4			
		7/2/84	9½					5.2.22			4¼			
Do.		7/2/84	9¼	9.16		0.858		6.0.2	612.6		4	3.92		
		7/2/84	9¼					5.1.22			4¼			
		7/2/84	9					4.3.22			3½			
Do.		7/2/84	9	9.16		0.858		5.2.0	646.7		3¾	3.37		
		7/2/84	9½					5.0.12			3			
		7/2/84	9					6.2.24			3⅜			
Do.		7/2/84	9¾	9.50		0.891		6.3.12	751.3		5	4.75		
		7/2/84	9½					6.3.18			5¾			
		7/2/84	9¼					6.1.12			3½			
Do.		7/2/84	9½	9.16		0.858		5.1.4	660.7		3½	4.66		
		7/2/84	9					6.0.14			6½			
		7/2/84	9					6.1.4			4			

In an official report it is stated that this Eucalypt covers an area of 14,000 square miles.

Exceptional diameter, 10 or 11ft.; average height, 100ft. exceptionally, 150ft.

South Western Australia.

292. **Eucalyptus melanophloia,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 220.

"Silver-leaved Ironbark," or "Ironbark."

The Rev. J. E. Tenison-Woods states that the wood of this species is not valued for any purpose, mainly because it is so small and stunted.

New South Wales and Queensland.

293. **Eucalyptus melliodora,** *A. Cunn.*, (Syn. *E. patentiflora*, Miq., *non* F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 210.

The "Yellow Box" of N.S.W. and Victoria. "Yellow Jacket" of the interior, the inner-bark being of a yellowish colour. In parts of Victoria it goes by the name of "Red Gum." It is sometimes called "Honey-scented Gum," owing to the perfume of its flowers. By the aboriginals of Gippsland it is known as "Dargan."

Timber hard, tough, durable, and close-grained; used to some extent by engravers. An excellent shade tree. The timber is of a yellowish colour, and when dry is extremely hard, very durable both in water and under the ground, heavy, also of remarkable toughness, but difficult to work, and as a rule not fissile. It is much utilized for spokes, rollers, heavy framework, and for naves, cogs, and treenails, also for rougher kinds of work, such as telegraph and fence posts, rails and slabs. It cannot well be sawn into planks on account of the frequent occurrence of broad perpendicular slits or cracks intervening between the layers, and thus it is apt to shell concentrically. It is excellent for fuel. The specific gravity of fully-seasoned wood varies from about .965 to 1.125, or from 60 to 70lb. per cubic foot. (Mueller.) Mr. Bäuerlen, writing from Colombo, Candelo, New South Wales, says: "It is here considered the best timber all round, and is used for a variety of purposes, but does not, as far as I can learn, last long in the ground."

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. melliodora*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific gravity.	
With the Apparatus weighing 780lb.	At the crisis of breaking.			Air dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.06	.58	2903	2177	1.112	.947
.08	.63	2781	2086	1.040	.876

The three following samples in the Technological Museum are well authenticated. They are called "Yellow Box."

1. Light in colour; close grain, and of a strong, tough nature. (Victoria.) 2. Rich dark brown. A well-seasoned log, showing a pretty figure; works very well. Diameter, 15in. (Between Wagga Wagga and Narandera, N.S.W.) 3. Wood yellow, and sound; dresses well. Diameter, 15in. (S. districts, N.S.W.)

The author feels little hesitation in referring the two timbers which follow to this species:—

1. No. 12 (London, 1862), 122 (Paris, 1855), labelled *E. corymbosa* in both catalogues—an obvious error. It is the "True," or "Yellow Box" of Camden, and "Bourrayero-gourroo" of the aboriginals. Diameter, 18 to 36in.; height, 30 to 50ft. "A low, branching species of Eucalyptus, not very abundant; timber of excellent quality." It is cross-grained, not good to work or dress, tough, and adapted for wheel-spokes. It is compact, moderately heavy, and has a beautiful wavy grain. 2. No. 34 (London, 1862), 264 (Paris, 1855). "Yellow Gum," of Berrima. Diameter, 24 to 40in.; height, 40 to 80ft. "Said to be a good timber." It is of a dark buff or pale brown colour, easy to work, shows gum-veins, but a good, useful timber.

Diameter, 18 to 24in.; height, 40 to 50ft.

Victoria, New South Wales and Queensland.

294. **Eucalyptus microcorys**, *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 212.

In Queensland it is known as "Peppermint," the foliage being remarkably rich in volatile oil. But its almost universal name is "Tallow Wood."

North of Port Jackson it bears the name of "Turpentine Tree," and "Forest Mahogany." The aboriginals of the Richmond River (New South Wales) call it "Wangee." The aboriginals of the Brisbane River (Queensland) call it "Tee."

Timber strong and durable, under or above ground. Used by wheelwrights for naves, felloes, and spokes; also for flooring, *e.g.*, in ball-rooms; for this latter purpose it is selected on account of its greasy nature. This greasiness is most marked where it is fresh cut. The very large trees are generally hollow, but as a rule those under 3½ft. in diameter are sound. (*General Report, Sydney International Exhibition*, 1879.) Its colour is yellowish-brown or yellowish.

The following logs from New South Wales are in the Technological Museum:—

1. Full of shakes, dark yellow colour, not good to work, cross-grained, inclined to wavy grain, heavy; diameter, 2ft. (Northern districts.) 2. Pale yellow colour, straight in the grain, and easy to work. Comparatively light in weight; diameter, 15in. (Macleay River.)

"TALLOW WOOD" (*E. microcorys*), EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality where Grown.	Approximate Date when the timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Gravity.
New South Wales.	Seasoned at least 12 months.	24/1/84	9¾	10.16	59.43	0.952	6.2.20	776.3	5¼	4.58	2119
		24/1/84	10½				0.2.24		4		
		28/1/84	10¼				7.1.17		4½		

Diameter, 6 to 8ft.; height, 100 to 120ft.

Northern coast districts of New South Wales to Cleveland Bay (Queensland).

295. **Eucalyptus microtheca,** *F.v.M.*, (Syn. *E. brevifolia*, F.v.M.; *E. brachypoda*, Benth.,—name of species in B.Fl.); N.O., Myrtaceæ, B.Fl., iii., 223 (partly).

Called "Bastard Box" in Western New South Wales, and "Black Box" in Queensland. This is the "Flooded Box" of the country around the Gulf of Carpentaria. It is also called "Narrow-leaved Box" and "Dwarf Box." It has many aboriginal names. The following are some of them:—"Callaille" and "Yathoo," Murchison River (Western Australia); "Targoon," Riverina (New South Wales); "Jimbul Kurleah," Cloncurry River, and other parts of Northern Queensland; "Coolybah," or "Coolibar," Western Queensland and about the Darling, New South Wales; "Goborra," or "Goborro," Western New South Wales; "Koloneu," Queensland.

This wood is reddish-brown or reddish (near the outside, however, the colour is grey), and remarkably hard, heavy and elastic. Mons. Thozet speaks of it with figures not unlike walnut, but darker, heavier, and closer grained. It is useful in building, though perhaps too hard for cabinet-work. It is neither very much used nor valued. "Piles made of the young trees have been used with advantage for the construction of the Great Northern Railway of Queensland." (Thozet.) This and *E. terminalis* are the only Eucalypts in much of the western desert.

Western and Northern Australia, also in the interior of South Australia, New South Wales and Queensland.

296. **Eucalyptus obliqua,** *L'Hér.*, (Syn. *E. gigantea*, Hook. f., *E. falcifolia*, Miq. (partly); *E. nervosa*, F.v.M.; *E. heterophylla*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 204.

A "Stringybark." It is called "Messmate" in Victoria because of its resemblance to *E. macrorrhyncha*. Other names are "Black Box" and "Ironbark Box," because the wood and bark are very like those of Ironbark, especially in old trees. Formerly called "Woolgook," or "Wangnarra," by the Yarra (Victoria) aboriginals.

This is a most useful tree for general purposes, although it is by no means the hardest of the Gums. It grows very quickly. Owing to the length and straightness of its stem, and the unusually

fissile nature of the wood, which enables it to be easily worked, it is brought into more general use than the timber of most other Eucalypts. For ordinary works it is in great demand, and is extensively used for fencing rails, scantlings, boards, shingles, palings, rafters, posts and scaffolding-poles (J. E. Brown); but it has some tendency to warp or twist. The timber is light in appearance, weighs from 50 to 60½lbs. per cubic foot of dry wood, therefore having a specific gravity of .809 to .990. It is said to be somewhat susceptible to dry rot. Its durability was, however, shown in pulling down the old courthouse at Hobart, when the timbers, forty years old, were found to be as sound as when put in. It also splits well, yielding palings 20in. broad. Near the base the wood assumes a beautiful wavy figure, which is admirably adapted for furniture, and very ornamental.

Following are brief descriptions of specimens of this timber, from rather small trees, in the Technological Museum. They are all from New South Wales, except the last, which is from Victoria:

1. "Stringybark." Warm brown, inclined to shakes, splits very freely, diameter of tree, 1ft. 9in. 2. "Stringybark." Warm brown, free from gum-veins, difficult to work to obtain a quite even surface, moderately heavy, diameter 2ft. (Adelong). 3. "Messmate." Buff or light-brown, wavy grain, works fairly well; a sound log, diameter, 2ft. 3in. (Southern district). 4. "Stringybark." Fairly sound and well-seasoned, light-brown, does not work easily, diameter 10in. (Macleay River, *sic.*) 5. "Stringybark." Brown colour, full of gum-veins, coarse grain.

This tree has been introduced extensively in India on the Nilgiris, and, on a smaller scale by way of experiment, in the Punjab, and in several places in the north-west Himalayas. (Brandis.) It has also been tried at Changa Manga, but has failed at Lucknow. (Gamble.)

Specimens of this timber from Bullarook Forest, Victoria, were examined by Mr. F. A. Campbell (*Proc. R.S. Vict.*, 1879.) His values of the tensile strength in pounds per square inch are 8500, 8500, and 8200. They broke with a short fracture. The wood was well seasoned, clean, but not quite free from shakes. Mr. Campbell, however, remarks that this should not, however,

affect its tensile strength to any extent. It was known locally as "Messmate." Rankin gives the following particulars in regard to the timber of *E. gigantea (obliqua)*: modulus of elasticity in pounds on square inch, 1,709,000; modulus of rupture, 13,000; weight, 54lb. per cubic foot.

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. obliqua*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.12	.50	2053	1540	1.045	.867
.14	.48	1776	1332	.935	.783

TASMANIAN "STRINGYBARK." *(E. obliqua.)*

(Experiments by Mr. James Mitchell,* see p. 338.)

No. of Experiments.	Name of Wood, etc., 7ft. long and 2in. square.	Specific Gravity.	E. Value of Elasticity. $L = \frac{l^2w'}{ad^2d}$	S. Value of Strength. $S = \frac{lw}{4ad^2}$
1	Green piece, brown coloured, 7ft. long, 2in. square	919	9661075	1856
2	Do. reversed grain	919	9305452	1932
3	Do. white coloured	798	7556976	1958
4	Do. do.	866	9313920	1958
5	Seasoned upwards of 6 years	925	9506060	2554
6	Do. do. 16 "	864	12583561	2551
7	Do. do. 18 "	947	13869273	2514
8	Do. do. 20 "	847	9927863	2564
9	Do. do. 20 "	838	10281134	2598

* Attached to the results was the following note:—"The results are also given of a series of experiments on the Stringybark, a gum wood extensively used in this and the neighbouring colonies for house building and general purposes. The specimens experimented upon were chosen because their ages were vouched by the gentlemen who supplied them, and not on account of their being specially calculated to sustain great weights. Pieces could, I have no doubt, be found capable of bearing greater weights than any I have recorded."

"MESSMATE" (*E. obliqua*), EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.	Geological Formation where the Trees grew.	Elevation above Sea-level.
Trentham, Victoria.	Seasoned at least twelve months.	7/2/84	9	9.96	58.28	0.933	9.2.10	797.8	3	3.44	2178	Upper Volcanic.	2,2000ft.
		Do.	$8\frac{3}{4}$				9.1.10		$3\frac{3}{4}$				
		Do.	9				5.2.12		4				
		Do.	9				4.1.8		2				
		31/1/84	12				7.0.0		$3\frac{3}{8}$				
		Do.	12				6.3.15		$4\frac{1}{2}$				

Diameter, 36 to 48in.; height, 100 to 150ft. Mr. James Mitchell (*Proc. R.S., V.D. Land*, 1851) measured a tree of this species in Tasmania which, at four feet from the ground, was 64ft. in girth.

Southern coast districts New South Wales, but chiefly in Victoria, Tasmania and South Australia.

297. **Eucalyptus occidentalis,** *Endl.*, including perhaps *E. macrandra, F.v.M.*, (a species in B.Fl., iii., 235), and *E. spathulata, Hook.*; N.O., Myrtaceæ, B.Fl., iii., 235.

The "Flat-topped Yate."

The timber is hard and strong, and is for that reason sought after by wheelwrights. (Muir.) It is probably as valuable as the timber of *E. cornuta*. (Mueller.) It is heavy and durable, and much used for posts, fence rails, fuel, etc. Height, 30 to 80ft.

South-western Australia.

298. **Eucalyptus ochrophloia,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm., xi., 36.

Called "Yellow-jacket," from its yellowish bark.

Wood of a brownish colour, hard, heavy, and close-grained. Height, about 50ft.

Near the Warrego and Paroo Rivers, New South Wales and Queensland.

299. **Eucalyptus odorata,** *Behr.*, (Syn. *E. porosa*, Miq.; *E. cajuputea*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 215.

One of the "Peppermint trees." "Box" and "White Box" are names it possesses, and about St. Vincent's Gulf (South Australia) it is known as "Red Gum."

This timber weighs from sixty to seventy pounds per cubic foot. It is very hard, durable, yellowish-white, is considered of fair quality, has a tough fibre, and is used for such purposes as naves, felloes, rails, slabs, firewood, and fence posts. As a rule the tree is too small to be available for general sawing purposes,

since it is almost invariably hollow, both in trunk and branches. (J. E. Brown.) A Victorian sample in the Technological Museum may be thus described: "Peppermint." Light brown colour, close, fine and straight in the grain.

South Australia, Victoria and south-east New South Wales.

300. **Eucalyptus pallidifolia,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 236.

The wood of this small tree is yellow near the bark, the rest red, hard, close-grained, and prettily mottled.

Northern Australia.

301. **Eucalyptus paniculata,** *Smith*, (Syn. *E. terminalis*, Sieb.; *E. fasciculosa*, F.v.M., including *E. paniculata* var. *fasciculosa*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 211.

Occasionally called "Bloodwood." It is the "Red Ironbark" of the New South Wales coastal districts, and, because its wood is paler than that of its congeners, it is also known as "White Ironbark," or "She Ironbark."

This wood is in good repute for durability. It is much used for posts for fencing, also for railway works, such as bridges, sleepers, carriages, etc. It is useful for large beams in buildings, stores for heavy goods, and for other purposes where great strength is required. Mr. George Hutchinson tells me that at Chiltern, Victoria, he has cut down one of these trees, split the timber, and as speedily as possible constructed a puddling machine. He states that it wears well and shrinks but little. A log in the Technological Museum, from the northern districts of New South Wales, is of a light-brown colour, heavy, seasons fairly well, is good to dress, and is from a tree 18in. in diameter. Another sample was No. 1, *N.S.W. Cat. London Exh.*, 1862, and No. 83, Exh. Paris, 1855. It is styled "White," or "Pale Ironbark," and aboriginal name at Illawarra, "Barremma." Diameter, 36 to 48in.; height, 80 to 120ft. . . . "The most valuable, perhaps, of all the Ironbarks, remarkable for its smooth, uniform outer bark, and its very hard, tough, inlocked, strong wood." It is of a dirty dark

brown colour, very good to work, and a heavy timber. Diameter, 36 to 48in.; height, 100 to 150ft.

Queensland, New South Wales and Victoria.

302. **Eucalyptus patens,** *Benth.*, N.O., Myrtaceæ, B.Fl., iii., 247.

A "Blackbutt."

This timber is considered durable; it is tough, and hence used for wheelwrights' work; it does not split. (Mueller.) Diameter, up to 6ft.; height, up to 100ft.

South-western Australia.

303. **Eucalyptus pauciflora,** *Sieb.*, (Syn. *E. coriacea*, A. Cunn., (the species name in B.Fl.); *E. plebophylla*, F.v.M.; *E. submultiplinervis*, Miq.; *E. piperita*, var. *pauciflora*, DC.; and *E. procera*, Dehn., (perhaps); N.O., Myrtaceæ, B.Fl., iii., 201.

"White Gum." "Mountain White Gum" (of the Blue Mountains, New South Wales), "Swamp Gum," "Drooping Gum," and "Flooded Gum." It is occasionally called "Mountain Ash" and "Peppermint." In Tasmania it is known as "Weeping Gum."

The wood, which is white in colour, is not of first-class quality, being rather soft and short-grained; it is, however, often used for fencing purposes. (J. E. Brown.) It is easy to cut, and of a lighter colour than the timber from most Eucalypts; it splits rarely, but it cannot readily be obtained in great lengths; it is excellent for fuel, but cannot be used underground. (G. W. Robinson).

The following two specimens are in the Technological Museum: 1. "Mountain White Gum." Warm brown colour, close in grain, split, and with a gum-vein (Victoria). 2. A sample, No. 33, *London Exh. Cat.*, 1862, and No. 263, *Paris Exh. Cat.*, 1855; is described "White Gum" of Berrima, "not of much value for timber, height of tree, 40 to 80ft.; diameter, 24 to 40in." It is of a yellow or buff colour, beautiful to work, straight in the grain, full of gum-veins, but looks exceptionally well under polish. Diameter, up to 4ft., with height of 100ft.

Tasmania, South Australia, Victoria and New South Wales.

304. **Eucalyptus pilularis,** *Sm.*, (Syn. *E. persicifolia*, DC.; *E. semicorticata*, F.v.M.; *E. ornata*, Sieb.; *E. incrassata*, Sieb.); N.O., Myrtaceæ, B.Fl., iii., 208.

The "Blackbutt," or "Great Blackbutt." From the great hardness of its wood it is often known as "Flintwood." It is a "Mountain Ash" of Illawarra (New South Wales), "Willow," or "White Top," of the country about Berrima (New South Wales). Sometimes it is called "Stringybark. By the aboriginals of South Queensland it is known as "Tcheergun," or "Toi." A New South Wales aboriginal name is "Benaroon."

Furnishes excellent timber for house carpentry, or any purpose where strength and durability are required, *e.g.*, bridge planking, ships' decks, paving cubes, etc. It can be used for telegraph poles and railway sleepers. (Woolls.) It is of a yellowish colour. Captain Ward, R.E., found the deflection of a sample of this timber from Berrima, N.S.W., to be 1.35in., the material used being 4ft. long by 2in. square, loaded in the middle with a weight of 980lb., while the elasticity remained unimpaired, breaking under a weight of 1232lb.; specific gravity, .990 (61lb. 14oz. per cubic foot.) He spoke of it as a very strong timber, but warping and twisting when exposed to the sun, and requiring gradual seasoning off the ground. (*Sydney Mint Expts.*, 1860.) Baron Mueller observes that this timber is not so well known as it ought to be. Its occasional liability to gum-veins has doubtless prejudiced it in popular favour. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 61lb. 7oz. per cubic foot. The Rev. Dr. Woolls observes of this tree: "Though rapid in growth, it is one of the most valuable species in the county of Cumberland, . . . and next to the White Ironbark (*E. siderophloia*); it is capable of enduring a greater crushing strain than any other Eucalypt."

Following are some samples in the Technological Museum: 1. "Blackbutt," or "Flintwood." Warm brown colour, close in the grain, and very strong; gum-veins. (Victoria.) 2. "Blackbutt." Light coloured, but dirty; full of shakes, works fairly

well; diameter, 2ft. 3in. (Eastern N.S.W.) 3. "Blackbutt." Very light coloured for a gum, a sound piece of timber, well seasoned, dresses very well; diameter, 15in. (Shoalhaven, N.S.W.) 4. "Blackbutt." Dark-brown, full of shakes, works fairly well; diameter, 18in. (N.S.W.) 5. The timber marked No. 31 in the N.S.W. timber list, London Exh., 1862, and No. 85, Paris Exh., 1855. "Mountain Ash," of Illawarra. "Willow," or White-top," of Berrima. Diameter, 24 to 48in.; height, 50 to 120ft. Much valued for rough purposes in districts where the better sorts of timber are not produced. It usually occupies rocky sites, and seems to form a link between the Ironbarks and the Gums. It is straight in the grain, moderately heavy, light reddish-brown, works fairly well, but is of a very gummy nature; adapted for bent work.

Diameter, 36 to 48in.; height, 100 to 150ft.

Eastern Gippsland to Southern Queensland.

305. **Eucalyptus piperita**, *Smith*, in *Trans. Linn. Soc.*, iii., 286 (partly); (Syn. *E. acervula*, Sieb.); N.O., Myrtaceæ, B.Fl., iii., 207.

"White Stringybark" and "Peppermint." It also bears the names of "Blackbutt" and "Redwood." A variety growing in the Braidwood district (New South Wales) goes by the names of "Messmate" and "Almond-leaved Stringybark."

This timber is durable; it is known to have kept sound for 40 years in damp soil; it is used for posts, shingles, house building, etc., and also for rough indoor housework. A log in the Technological Museum is labelled "Redwood," or "Peppermint" (S. and W. Districts of N.S.W.) Timber red, a mass of shakes, works with difficulty; diameter, 2ft.

In the *Sydney Mint Experiments*, 1860, a sample of timber, "White Stringybark" (*Eucalyptus sp.*), (*E. acervula* in the M.S.), was experimented upon, which doubtless belongs to this species. It came from Berrima; specific gravity, .922; value of E, 351,600; of S, 2,268.

"BLACKBUTT" *(E. piperita)* EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Dimension of Trees.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.	Geological Formation where the Trees grew.	Elevation above Sea Level.
Ranges near Fernshaw, Victoria.	19/1/83	2ft. 6in. diameter.	28/1/84	11½	11.83	69.22	1.109	4.3.0	547.6	2¼	2.65	1495	Felspar Porphyry.	A few hundred feet.
			14/2/84	12¼				4.2.2		2¾				
			14/2/84	11¾				5.1.17		3				

Diameter, 24 to 36in.; height, 80 to 100ft.

Gippsland, New South Wales and Queensland.

306. **Eucalyptus Planchoniana,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm., xi.

This timber is sound, heavy, hard and durable, well adapted for sawing, but not easy to split. (Bailey.)

Near Brisbane and in New South Wales.

307. **Eucalyptus polyanthema,** *Schau.*, N.O., Myrtaceæ, B.Fl., iii., 213.

The "Red Box" of South-eastern Australia. Called also "Brown Box," "Grey Box," and "Bastard Box." "Poplar-leaved Gum" is another name, but it is most commonly known as "Lignum Vitæ" because of its tough and hard wood. It is the "Den" of the Gippsland aboriginals.

Great durability is attributed to this wood, though the stems often become hollow in age, and thus timber of large dimensions is not readily afforded. It is much sought after for cogs, naves and felloes; it is also much in demand for slabs in mines, while for fuel it is unsurpassed. (Mueller.) Its great hardness is against its general use. A Victorian sample in this Museum may be described: "Red Box," of a brownish-red colour, fine in the grain, and very tough.

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. polyanthema*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total Weight required to Break each piece.	Value of Strength, $S=\frac{LW}{4BD^2}$	Specific Gravity.	
With the Apparatus weighing 780lb.	At the crisis of Breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.10	.56	3215	2411	1.248	1.031
.08	.58	3145	2359	1.214	1.010

Height, occasionally up to 250ft.

Victoria and New South Wales.

308. **Eucalyptus populifolia,** *Hook.*, (Syn. *E. populnea*, F.v.M.; and including *E. largiflorens* var. *parviflora*, Benth.; *E. platyphylla*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 214 and 242.

This tree is variously known as "White Box," "Red Box," "Poplar Box," and "Bimbil (or Bembil) Box." Called "Nankeen Gum" in Northern Australia, from the peculiar light-brown colour of the bark, and "White Gum" in Queensland. "Egolla" of the natives of Northern Queensland.

The timber is hard, heavy, close-grained, and durable; used for posts and building purposes, mauls and railway sleepers, etc., but at least fifty per cent. of the wood is unsound. It is of a grey or light brown colour, very tough and strong, hard to work, but is a handsome wood when polished. It is sometimes rather subject to gum-veins. A variety of this Eucalypt in Northern Queensland with enormous leaves, yields a very inferior wood, which, according to the Rev. J. E. Tenison-Woods, is not used even for burning. Diameter, 24in.; height, 50 to 60ft.

New South Wales, Queensland and Northern Australia.

309. **Eucalyptus punctata,** *DC.*, (Syn. *E. Stuartiana* var. *longifolia*, Benth., (partly); *E. tereticornis* var. *brachycorys*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 244.

The tough bark of this tree earns for it the name of "Leather-jacket." In the neighbourhood of Twofold Bay it is called "Hickory" and "Turpentine." About the south-east coast it is often called "Grey Gum." Other vernacular names are "Red Gum," "Yellow Gum," and "Bastard Box."

The wood is tough, pale reddish-brown, extremely durable, hard, close-grained, difficult to split, and in use for fence posts, railway sleepers, wheelwrights' work, and many other building purposes, in ship-building, etc. It is durable underground, though not equal in value to Ironbark; it affords also a superior fuel. (Mueller.) It is remarkable for its extreme hardness. (Woolls.)

Following are particulars of two logs of small diameter in this Museum: 1. Yellow sap-wood, red heart-wood, sound and well seasoned; diameter 1ft. (Port Hacking.) 2. Rich brown, flawed with gum-veins, not good to work, seasons fairly well; diameter, 10in. (Macleay River.)

A tree called "Grey Gum" in the neighbourhood of Cambewarra,* New South Wales, has been pronounced by Baron Mueller to be of this species. It has a height of 40 to 50ft., and a diameter of 2ft. The bark is smooth, deciduous, and usually looks grey in large patches, hence the local name. The part of the trunk not occupied by patches of persistent bark is a dirty white, which dries to a dark reddish-buff, bark solid, and one inch in thickness. The timber is red, hard, and heavy, much resembling in those characteristics the "Red Ironbark" of the district (? *E. paniculata*), and by some bushmen considered equal to it; by others not much liked because (they say) the fibre is too short. Mr. Bäuerlen tells me he has a cabinet specimen which is frequently pronounced to be "Ironbark" by people who have a good knowledge of Australian hardwoods. Height, about 100ft.

New South Wales.

310. **Eucalyptus pyriformis,** *Turcz.*, (Syn. *E. pruinosa*, Turcz.; *E. erythrocalyx*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 226.

Amongst the settlers at Fowler's Bay (South Australia) it is known as the "Ooldea Mallee," from the circumstance of its occurrence at Ooldea. (R. Tate, quoted by J. E. Brown.)

A small tree, but the timber is hard, heavy, durable, and yellow-white in colour. (J. E. Brown.)

Western and South Australia.

311. **Eucalyptus Raveretiana,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm., x., 99.

"Grey Gum," "Iron Gum," and "Thozet's Box;" also "Woolly-butt."

The wood is durable, dark coloured, excessively hard, and valuable for underground piles and railway sleepers, and many other purposes; it will resist the heaviest blow. (Bowman and Thozet.) Baron Mueller expresses the opinion that this will prove a useful species in wet tropical countries for the comparatively speedy production of a hardwood timber. It is of a dark drab

* The most southern locality yet recorded for this species.

colour, speckled with white, and it would be useful for cabinet-work. Attains a diameter of 10ft.; height, 300ft.

Queensland.

312. **Eucalyptus redunca,** *Schau.*, (incl. *E. xanthonema*, Turcz.); N.O., Myrtaceæ, B.Fl., iii., 253.

The colonists' name is "White Gum," that of the aboriginals "Wandoo."

This tree furnishes a pale, hard, particularly tough, heavy and durable timber, prized for building purposes, various implements, and especially for wheelwrights' work, supplying the best shafts, cogs, naves, spokes, and felloes. The seasoned wood weighs about 70lb. per cubic foot. Mr. Allen Ransome examined a sample of this timber sent to the Colonial and Indian Exhibition. He reports: "It is very similar to Tuart (*E. gomphocephala*). Felloes were shaped, and spokes were turned from it, the finish being, if anything, superior to that of Tuart." Height, up to 120ft.

Western Australia.

313. **Eucalyptus resinifera,** *Smith*, (incl. *E. spectabilis*, F.v.M.; *E. pellita*, F.v.M.; *E. Kirtoniana*, F.v.M.; *E. hemilampra*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 245.

The "Red," or "Forest Mahogany," of the neighbourhood of Sydney. These are bad names, as the wood bears no real resemblance to the true Mahogany. Because the product of this tree (or perhaps that of *E. siderophloia*) first brought Australian kino into medical notice, it is often in old books called "Botany Bay Gum-tree." Other names for it are "Red Gum," "Grey Gum," "Hickory," and it perpetuates the memory of an individual by being called "Jimmy Low."

[It is not always possible to reconcile the statements which have been made in regard to the timber of *E. resinifera*, unfortunate confusion having arisen between this species and *E. siderophloia* (see p. 516), which has *E. resinifera* as one of its synonyms. In the colonies the usual equivalent for *E. resinifera*, Sm., is "Mahogany," and that for *E. resinifera*, A. Cunn. *(siderophloia)*, "Ironbark."]

This timber is much prized for strength and durability, and is used for piles, as it is said to resist the action of Cobra. (Hill.) It is used for ships' knees, shingles, posts, and general building

purposes; it is not liable to shrink, and it lasts well underground. The Rev. Dr. Woolls speaks of its usefulness for fencing, beams, etc., and says that it is very durable. Rafters of this wood last for upwards of fifty years, as for instance in St. John's Church, Parramatta (erected in 1798), which were taken down in 1852, and found to be in a perfect state of preservation. But in speaking of lengthened tests, it must not be forgotten that British Oak, for instance, has remained intact, when used in buildings, for hundreds of years, and however certain in our mind we may be of the durability of such timbers as *E. resinifera*, the period of their use has been but short up to the present.

The description of the timber of the "Ironbark Tree" (*E. resinifera*), Laslett, *Timber and Timber Trees*, 199 *et seq*, refers to *E. siderophloia*, to which species it has been transferred in the present work, see p. 516.

The following brief descriptions of small timbers in the Technological Museum allude to authentic specimens of *E. resinifera*, Smith. They are all from New South Wales. 1. "Red Mahogany." Very dark red, difficult to work, a sound timber, hardly a trace of a shake, diameter, 9in. (Milton, near Ulladulla). 2. "Mahogany." Light-brown, very heavy, seasons fairly well; diameter, 2ft. (Eastern N.S.W.) 3. Dark red colour, exceedingly good to work, close, smooth grain, a heavy timber, very strong and durable. This specimen was taken from the roof in the Church at Parramatta (*vide supra*), No. 44, *London Exh. Cat.*, 1862, No. 241, *Paris Exh. Cat.*, 1855. Its ordinary name was "Mahogany," and the aboriginal name in Cumberland and Camden "Booah." Diameter, 36 to 60in.; height, 60 to 130ft. "A noble timber tree, the wood prized for its strength and durability." 4. "A rare variety found at Appin; the timber apparently a good hard wood, No. 37, London, 254, Paris, may certainly be assigned to this species. It tears a little, and has a gum-vein, otherwise it cannot be distinguished from (3).

Writing to me from Oporto, Portugal, Mr. W. C. Tait says: "This tree grows very well in this country. It is a hardier tree than *E. globulus*, standing both drought and cold better when

young. I have planted most of the New South Wales Eucalypts; many of them, however, are too tender for this climate when young, five or six degrees of frost killing them off, *E. resinifera* is an exception." It is, however, possible that *E. siderophloia* may be alluded to. Diameter, 20 to 30in.; height, 80 to 120ft.

New South Wales and Queensland.

314. **Eucalyptus robusta,** *Smith,* (Syn. *E. rostrata,* Cav. non Schlecht.); N.O., Myrtaceæ, B.Fl., iii., 228.

This tree is known as "White," or "Swamp Mahogany," from the fact that it generally grows in swampy ground. It is also called "Brown Gum." Aboriginal names are as follows:—"Dadangba," Queensland (according to Leichhardt); "Gnorpin," "Kimbarra," Queensland; "Gunnung," Richmond River (New South Wales).

This timber is much valued for shingles, wheelwrights' work, ship-building, and building purposes generally. As a timber for fuel, and where no great strength is required, this species is excellent, especially when we consider its adaptability to stagnant, swampy, or marshy places. It is reddish, difficult to split, and rather brittle; is much used for round and square posts, joists, and sleepers, and is remarkable for its freedom from destructive insects, ascribable to the presence of kino-red. The specific gravity of air-dried wood is 1.098; absolutely dry, .889. Analysis gave 19 per cent. of kino-red. This is the largest percentage of kino-red hitherto observed in any wood, *E. rostrata* and *E. marginata* ranking next with from 16 to 17 per cent. How far the presence of a greater or lesser quantity of this substance in Eucalyptus timber affects its durability remains to be proved; certainly its predominance in the most lasting woods seems to point out its being the main factor in this respect. (Mueller.) *Vide* Prof. Abel's report on the wood of *E. marginata*, p. 484. Dr. Woolls speaks of the usefulness of this wood for mallets, rough furniture, and inside work, but states that it is not considered durable. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 58lb. 9oz. per cubic foot.

Following are descriptions of some New South Wales specimens of this timber: 1. "Swamp Mahogany." Dark red, few gum-veins, seasons well, works easily; diameter, 10in. (Macleay River.) 2. "Swamp Mahogany." Rich red colour, with a few lighter patches, few gum-veins, comparatively free from shakes; inclined to corrugate in seasoning; diameter, 2ft. 3. "Brown Gum." Dark red, full of gum-veins, cross-grained, difficult to work; diameter, 18in. (Sydney.) 4. "Stringybark," of Sydney Mint Experiments, 1860. From Brisbane. Specific gravity, .977; value of E, 403,000; of S, 1680. "Suitable for building and other purposes, for which it is most prized." It is light brown, fairly straight in the grain, works free, clear of gum, is well adapted for shafts of carts and drays, and framework of the same. Diameter, 24 to 48in.; height, 100 to 150ft.

Coastal regions of New South Wales.

315. **Eucalyptus rostrata,** *Schlecht.*, (Syn. *E. longirostris*, F.v.M.; *E. acuminata*, Hook.; *E. brachypoda*, Turcz. *non* Benth.; *E. exserta*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 240.

Commonly called "Red Gum." A "Flooded Gum" and "River Gum" of New South Wales and Queensland. Occasionally called "Blue Gum" about Sydney. In South Australia it is called "White Gum." Sometimes it is called "Forest Gum." It is the "Yellow-jacket" of the neighbourhood of Stanthorpe (Queensland). By the aboriginals of the Lower Murrumbidgee (New South Wales) it goes by the name of "Biall," while to those of the western interior it is known as "Yarrah." "Yarrah," however, according to Dr. Woolls, is a name applied by the aboriginals to almost any tree. In Western New South Wales it is called "Creek Gum," as it is always found near watercourses.

This timber is highly valued for strength and durability, especially for piles and posts in damp ground; it is used also for ship-building, railway sleepers, bridges, wharves, and numerous other purposes. This timber is exceedingly hard when dry, and therefore most difficult to work; this limits its use for furniture.

In the durability of its timber, perhaps, it has only a rival in *E. marginata* (Jarrah), of Western Australia, resisting *Teredo*, *Chelura*, and *Termites*. When properly seasoned it is well adapted

for heavy deck-framing, the beams and knees of vessels, and for planking above high-water mark. In Victoria it has been much used for railway sleepers, and various articles of furniture (Woolls), wheelwrights' work (especially felloes), engine buffers, etc. It should be steamed before it is worked for curving. The specific gravity ranges from .858 to 1.005, or from 53½ to 62½lb. per cubic foot. A ton of the dry wood has yielded as much as 4lb. of pearlash, or 2½lb. of pure potash. (Mueller.) The air-dried wood of this species contained, according to one experiment, 4.38 per cent. of kino-tannin, and 16.62 per cent. of kino-red; the latter (allied to *Phlobaphene*) is soluble in alcohol, but not in water; the large percentage of these two substances in *E. rostrata* is only rivalled, as far as known, by that of the hardest kind of Jarrah (*E. marginata*). In Southern New South Wales it is invariably chosen for house blocks, and preferred for posts, etc., on account of its durability in damp ground. It is also used for slabs, rails, and wheelwrights' work.

A sample of this timber, sent from Victoria to the Colonial and Indian Exhibition, was tested by Mr. Allen Ransome, who reported: "The sample sleeper sent for trial, though a hard specimen, was readily adzed and bored, and a plank passed through the planing machine gave fair results."

Some Victorian specimens were examined for tensile strength by Mr. F. A. Campbell (*Proc. R.S. Victoria*, 1879). His results are 14,000 to 21,500, 16,200, and 15,700lbs. per square inch. "The last specimen was at a disadvantage, not being hung perfectly straight. They all broke with a long fracture."

A variety of this tree is found in the extreme Western portion of New South Wales. Its average height is 30 to 40ft., and diameter, 1 to 2ft. Locally it is not considered of much use, except for firewood. But the limbs and branches make excellent charcoal; a charcoal-burner "prefers it to any other wood for the purpose," while a local blacksmith pronounces the product "excellent." Some specimens of this charcoal were sent to the Museum, and it is well-burnt, clean, and in every respect a good article.

Experiments on the Transverse Strength of the wood of *E. rostrata* var. (Dark Red Gum), by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of Strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.10	.65	2539	1904	1.045	.874
.09	.68	2417	1813	.984	.809

E. rostrata var. (Pale Red Gum).

Deflection.		Total weight required to break each piece.	Value of Strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.08	.52	2781	2086	1.008	.843
.07	.48	2712	2034	.940	.790

Following are descriptions of some logs of this species in the Technological Museum: 1. "Red Gum." Very dark red colour, curly and figured, looks well in cabinet-work (Victoria). 2. "Red Gum." Rich colour, full of shakes, difficult to work; diameter, 14in. 3. "Red Gum." A sound log, few gum-veins, rich red colour, rather curled and interlocked; hard to work, but after much labour produces a beautiful face; diameter, 20in. This and the preceding are from between Wagga Wagga and Narandera, N.S.W. 4. "Red," or "Flooded Gum." Inclined to shakes; shows a pretty curly grain over its entire longitudinal section; dark red, very difficult to work and dress; diameter, 2ft. (N.S.W.) 5. "Flooded Gum." Light bad colour, inclined to shakes and gum-veins, works fairly well; diameter, 2ft. (Eastern

N.S.W.) 6. "Red Gum." Very wavy grain, bright red, twisted much in drying, full of shakes, very difficult to work; this timber cannot be faced with a plane, but has to be finished off with a scraper; diameter, 2ft. (Southern N.S.W.) 7. "Flooded Gum." Red, rather pretty wavy appearance; comparatively light in weight. Called "Umbagga" by the blacks in Northern N.S.W. "Plentiful on the Clarence. This timber is extensively used for building purposes, such as scantling, battens, flooring boards, and for posts and rails, ships' planks, etc.; it is often 7ft. in diameter, with a stem, without knot or flaw, of from 70 to 80ft. in length. Many trees yield from 6,000 to 8,000ft. of timber." (*Cat. N.S. W. Timbers, London Exh.*, 1862.)

Diameter, 6 to 8ft.; height, 100ft.

South Australia to Northern Queensland.

316. **Eucalyptus saligna,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 245.

About the Brisbane River, and in New South Wales, it is variously known as "Grey Gum," "White Gum," "Blue Gum," and "Flooded Gum." The two latter are its common names about Sydney. Other New South Wales names for it are "Grey Box" and "Silky Gum."

This timber is in good repute for rails for fencing and building purposes, as it does not readily take fire; it is also both strong and durable. (Hill.) It is excellent for railway sleepers. "According to Mr. Fawcett, the straightness of the stem renders it fit for spars, while Dr. Woolls calls the wood splendid, and states that it is largely used for ship-building; other data pronounce it to be an inferior wood, and this discrepancy may be reconciled by local diversities of the ground, from which particular trees were taken." (Mueller.) This wood is extensively used for building purposes, ships' planks, naves and felloes of wheels, etc. (Woolls.) Mr. H. Deane informs me that what is considered to be a variety of this species possesses the names, at Tenterfield, New South Wales, of "White," or "Silky Gum," on account of the satiny lustre or sheen of the bark. Grows well at Lucknow, India. (Gamble.)

The following specimens of the normal species are in the Technological Museum: 1. "Grey Gum." Full of shakes, very cross-grained, hard to work, warm brown, very heavy; diameter,

1ft. 9in. (Northern N.S.W.) 2. No. 23, London Exh., 1862; 244, Paris Exh., 1855. "Grey Gum" and "Maandowie" (aboriginal), names in Cumberland and Camden; diameter, 24 to 48in.; height, 60 to 100ft. "An excellent gum timber." It is of a brown colour, heavy, cross-grained, and difficult to season. 3. "Red Gum," of Berrima. No. 37, London Exh., 1862; 268, Paris Exh., 1855. Diameter, 24 to 40in.; height, 40 to 80ft. "Said to produce good timber." Of warm red colour, and wavy appearance, close in the grain, and a splendid working timber.

"BLUE GUM" (*E. saligna*), EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Sample in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflections at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.
Queensland.	Seasoned at least 12 months.	28/1/84 4/2/84 4/2/84	11 10¾ 11	10.92	63.89	1.023	6.3.7 6.2.22 7.1.8	777.6	4½ 4¼ 5¾	4.83	2123

In the report of the Board this timber was described as *E. botryoides*. *Vide E. botryoides* (*supra*), for an explanation as to the circumstances under which the confusion has arisen.

Diameter, up to 7ft.; height, up to 100 or 120ft.

New South Wales and Southern Queensland.

317. **Eucalyptus salubris,** *F.v.M.*, N.O., Myrtaceæ, F.v.M., Fragm., x., 54.

Called "Fluted Gum," or "Gimlet Gum," from the structure of the stem.

This wood is tough, yet easy to work, and serves for poles, shafts, and a variety of implements, and also for rough wood-engraving. (Mueller.) Height, up to 120, and even 150ft.

Western Australia.

318. **Eucalyptus setosa,** *Schauer*, N.O., Myrtaceæ, B.Fl., iii., 254.

The wood of this small or moderate-sized tree is of a dark brownish colour, subject to gum-veins, therefore only fit for using in the log; hard, strong, and durable.

Near the Gulf of Carpentaria.

319. **Eucalyptus siderophloia,** *Benth.*, (Syn. *E. resinifera*, A. Cunn., *non* Smith.; *E. persicifolia*, DC.; and prob. *E. fibrosa*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 220.

This is an "Ironbark," and it is sometimes called "Red Ironbark" and "Broad-leaved Ironbark." It is the "Tanderoo" of the aboriginals of Southern Queensland.

[The unfortunate confusion between this species and *E. resinifera*, Smith., has already been alluded to. See p. 508.]

This timber has the highest reputation for strength and durability, and is used for large beams in stores for heavy goods, railway sleepers, and other purposes where great strength is required. It is also used for dray poles. Its extreme hardness renders it difficult to work. It is light-coloured and heavy. For spokes, the preference is given to it over almost all other kinds of wood, but the tree has become much more scarce than formerly.

The following account of the timber, by Laslett, will be found in *Timber and Timber Trees*, under the heading of *E. resinifera*. The present species is intended:—

"It yields timber of from 20 to 40ft. in length, by from 11 to 16 or 18in. square. It was named "Ironbark" by some of the earliest Australian settlers, on account of the extreme hardness of its bark, but it might with equal reason have been called iron-wood. The wood is of a deep red colour, very hard, heavy, strong, extremely rigid, and rather difficult to work. It has a plain, straight grain, and the pores, which are very minute, are filled with a hard, white, brittle secretion. The tree is generally sound, but liable to the defect of both heart and star-shake, and on this account it is not usually very solid about the centre, consequently the timber cannot be employed with advantage except in stout planks or large scantlings. It is used extensively in ship-building and engineering

works in Australia, and in England it is employed in the mercantile navy for beams, keelsons, and in many ways in the construction of ships, especially below the line of flotation, where a heavy material is not considered objectionable. For civil architecture, the ornamental and domestic arts, it is not, however, likely to be in much request, its extreme hardness and great weight precluding it from general use."

Following are specimens of this timber in the Technological Museum: 1. No. 4, *London Cat.*, 1862; 137, *Paris Cat.*, 1855. "Broad-leaved Rough Ironbark" and "Terri-barri," names in Cumberland and Camden. Diameter, 24 to 48in.; height, 80 to 120ft. "From Appin, common in Cumberland; one of the strongest and most durable of timbers." The *Paris Cat.* also states: "Rough-leaved, rough-barked Ironbark." "This tree has been proposed as their emblem by the colonists of New South Wales." Of a very dark red colour, very good to work, and even in grain. 2. "Ironbark of the Clarence;" "Algerega" of the aboriginals. "This well-known tree attains a very large size in the northern districts—upwards of 100ft. in height, and as much as 5ft. in diameter. Timber very highly valued for its unequalled strength and durability; it is used for all kinds of fencing, shingles, beams, dray poles, plough beams, and various other purposes; when properly seasoned it will not shrink." (*Cat. London Exh.*, 1862.) It is of a dark brown colour, heavy, hard, and close in the grain. 3. The wood described in the Sydney Mint Experiments, 1860, as "Rough-barked Ironbark, *E. resinifera*," is *E. siderophloia*. It came from Brisbane, and "is much prized for building and other purposes." Specific gravity, 1.15; value of E, 639,400; of S, 2962. It has a wavy grain, and is of a dark reddish-brown colour. It is tough, hard to work, and well adapted for the felloes of wheels of drays and carts of all sorts. It lasts well for piles in water and for posts. It is very heavy.

Specimens of this timber from New South Wales were examined by Mr. F. A. Campbell (*Proc. R.S., Victoria*, 1879), as regards their tensile strength. His figures are 21,000 and 26,500lb. per square inch. "The grain is not at all uniform, being much twisted in parts."

TRANSVERSE EXPERIMENTS.

(Laslett.)

Number of the Specimen.	Deflections. With the Apparatus Weighing 390lb.	After the Weight was removed.	At the crisis of Breaking.	Total Weight required to Break each Piece.	Specific Gravity.	Weight Reduced to Specific Gravity, 1000.	Weight Required to Break 1 Square Inch.
	Inches.	Inch.	Inches.	Pounds.			Pounds.
1	.85	.0	3.75	1460	1163	1255	365.0
2	1.00	.0	3.50	1370	1146	1195	342.5
3	.90	.0	4.00	1400	1142	1226	350.0
4	1.00	.0	4.00	1400	1116	1254	350.0
Total	3.75	.0	15.25	5630	4567	4930	1407.5
Average	.94	.0	3.812	1407.5	1142	1232	351.9

No. 1.—Wiry fracture, 16in. in length.
„ 2.— „ 12in. „
„ 3.— „ 10in. „
„ 4.—Broke short to one-third depth, then splintery fracture, 10in. in length.

TENSILE EXPERIMENTS.

(Laslett.)

Number of Specimen.	Dimensions of each piece.	Specific gravity.	Weight the piece broke with.	Direct cohesion on 1 Square Inch.
	Inches.		Pounds.	Pounds.
5	2 x 2 x 30	1142	34,160	8,540
6	2 x 2 x 30	1146	26,880	6,720
7	2 x 2 x 30	1163	39,480	9,870
Total		3451	100,520	25,130
Average		1150	33,507	8,377

Vertical or Crushing Strain on Cubes of Two Inches.

No. 8. Tons.	No. 9. Tons.	No. 10. Tons.	No. 11. Tons.	Total. Tons.	Average. Tons.	Ditto on 1 Square Inch. Tons.
18.500	17.625	18.500	19.000	73.625	18.406	4.601

E = 960740. S = 3695.

"IRONBARK" (*E. siderophloia*), EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by 1⅞in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.
New South Wales.	Seasoned at least twelve months.	24/1/84	12	12.00	71.50	1.124	1.145	8.3.16	1028.0	1045.6	3 3-16	3.81	4.21	2854
		7/2/84	12¼					9.1.6			4¼			
		7/2/84	11¾					9.1.10			4			
Do.		24/1/84	12	12.16		1.139		7.3.14	935.0		4⅝	4.37		
		28/1/84	12½					8.2.7			4¼			
		7/2/84	12					8.2.12			4¼			
Do.		31/1/84	12⅝	12.50		1.171		10.0.14	1174.0		4⅝	4.46		
		7/2/84	12½					10.2.20			4½			
		7/2/84	12⅜					10.2.16			4¼			
Queensland.		31/1/84	11¼	10.92	63.90	1.023	1.023	7.1.15	672.3	672.3	4¼	4.08	4.08	1835
		4/2/84	10¾					6.0.22			3¾			
		4/2/84	10¾					4.1.20			4¼			

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. siderophloia*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{L W}{4BD^2}$	Specific gravity.	
With the Apparatus weighing 780lbs.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.02	.63	3873	2905	1.075	.936
.02	.56	3752	2814	1.129	.953

Diameter, 20 to 40in.; height, 70 to 100ft.

Southern Queensland, south to Port Jackson.

320. **Eucalyptus Sieberiana,** *F.v.M.*, (Syn. *E. virgata*, Sieb., the species name in B.Fl.); N.O., Myrtaceæ, B.Fl., iii., 202.

Called " Cabbage Gum " in the Braidwood district (New South Wales); " Mountain Ash " about Berrima, Illawarra, and Twofold Bay (New South Wales). It is a " Stringybark." It is called " Gum-top" in Tasmania and at Wilson's Promontory (Victoria). It is "Ironbark" in Tasmania, and occasionally " Blackbutt." "It is the "Yowut " of the Gippsland aboriginals.

This timber is considered, in the Braidwood and Monaro districts, N.S.W., so soft and perishable for ordinary purposes that it is called "Cabbage Gum," but it is nevertheless very durable underground. (Bäuerlen.) The trunk is sawn into good timber, and it is also used for posts and rails; it is, amongst other purposes, recommended for shafts. It is hard, and when seasoned difficult to cut, but burns well even when fresh. (Mueller.) The wood is of superior quality, light, tough, and elastic; is used for swingle-trees of buggies, ploughs, etc., but will not endure underground. (Howitt.) The testimony of Howitt and Bäuerlen as to the durability of this timber is very conflicting. Howitt's observations were made in Gippsland (Victoria), while those of Bäuerlen were made near Braidwood (N.S.W.) Until more light is thrown

on the subject one can only attribute the discrepancy to the different circumstances under which the trees are capable of growing, as remarked by Baron Mueller in regard to contradictory evidence respecting the durability of the wood of *E. saligna* (*vide supra*). I have received a letter from Mr. Bäuerlen, to whom I had referred this for the third time for further enquiry. He says: "All my enquiries about the timber of *E. Sieberiana* result exactly in what I reported of it formerly. . . It is generally considered a first-rate firewood, by some even the very best; in fact, the choice lies here between it and *E. stellulata*." The following is additional evidence as to the durability underground of the timber. The timber used in the Long Tunnel Mine (a damp mine), Walhalla, Gippsland, "consists chiefly of *E. Sieberiana*, *E. capitellata*, *E. obliqua*, *E. amygdalina*, and *E. viminalis*. The first of these, *E. Sieberiana*, is by far the best; it lasts many years." (Tisdall, *Proc. R.S., Victoria*, 1887, p. 43.) Used by wheelwrights for spokes and naves of wheels. (*General Report*, *Sydney Exh.*, 1879.)

Following are some samples of this timber in the Technological Museum:—

1. "Mountain Ash." Light brown, full of shakes and gum-veins, difficult to work; diameter 2ft. 9in. (S. and W. districts, N.S.W.) 2. "Cabbage Gum." Reddish colour, rather coarse and cross-grained, very tough, moderately heavy, dresses fairly well on the end grain; diameter, 1 to 2ft.; height, 40 to 50ft. (Delegate, N.S.W.) 3. "Cabbage Gum." Fairly good to work, but full of gum-veins, seasons badly; colour, buff; weight, light; does not dress well on the end grain; diameter, 1 to 2ft; height, 40 to 60ft. (Haydon's Bog, Delegate.) 4. "Mountain Ash." Light brown colour, gum-veins, tough, and light in weight; easy to work. (Victoria.)

Mr. Allen Ramsome tested samples of this timber sent from New South Wales to the Colonial and Indian Exhibition. From the specimen submitted spokes were turned, casks made, and boards planed. "In all cases it proved an easy wood to work."

"GUM TOP STRINGYBARK" *(E. Sieberiana)*, EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality where Grown.	Approximate Date when the timber was cut.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Average Specific Strength.
Tasmania.	Seasoned at least 12 months.	24/4/84	9	9.56	55.94	0.896	7.3.8	876.0	4	4.50	2391
		24/4/84	$10\frac{1}{8}$				7.3.8		5		

Diameter, up to 5ft., with an exceptional height of 150ft.

Tasmania, Victoria and New South Wales.

321. **Eucalyptus Staigeriana**, *F.v.M.*, N.O., Myrtaceæ, in Bailey's Synop., Queensland Flora. (Muell. Cens., 3rd Annual Supplement, for 1885.)

Called "Lemon-scented Ironbark," owing to the fragrance of its leaves.

A tree of medium size. Wood of a red colour, hard, and durable.

Queensland.

322. **Eucalyptus stellulata**, (incl. by A. Cunn. with *E. stricta*, and called *E. microphylla*, which name was altered by G. Don to *E. Cunninghami)*; N.O., Myrtaceæ, B.Fl., iii., 200.

The "Box," "White Gum," "Lead Gum," or "Green Gum" of East Gippsland, and New South Wales as far as the Blue Mountains. It is the "Olive-green Gum" of Leichhardt. In Gippsland it is known by the names of "Black Sallee" and "Muzzle-wood." "Sallee," or "Sally," and "Black Gum" are also names given to it in the Braidwood district.

This wood is not valued. (Woolls.) It is used for fuel, and even for this purpose it is not of the first quality. Large areas on

the Monaro (N.S.W.) have almost no other timber but *E. Sieberiana* and this species. The trunk of the latter does not there often extend to a greater height than 12ft.

Following are samples in the Technological Museum: 1. "Sally," or "Black Gum," very cross-grained, of a soapy nature, knotty; of a flesh colour. Diameter, 2 to 3ft.; height, 30 to 50ft. (Haydon's Bog, Delegate, N.S.W.) 2. "Lead-coloured Gum" of Berrima, No. 35, *London Cat.*, 1862; 266, *Paris Cat.*, 1855. Diameter, 18 to 30in.; height, 30 to 40ft. "Of no value for timber, but excellent for fuel."

Victoria and New South Wales.

323. **Eucalyptus Stuartiana,** *F.v.M.*, (Syn. *E. persicifolia*, Miq. *non* Lodd.; *E. Baueriana*, *non* Schauer.; *E. falcifolia*, Miq.; *E. pulverulenta*, Sims, is very closely allied to *E. Stuartiana*, and it is a question whether they ought not to be united); N.O., Myrtaceæ, B.Fl., iii., 243 (partly).

Frequently called "Turpentine Tree," or "Peppermint Tree." In Victoria it is known as "Apple Tree," "Apple-scented Gum," "White Gum," and "Mountain Ash." It is the "Woolly Butt" of the county of Camden (New South Wales). Occasionally it is known as "Stringybark." It is called "Box" about Stanthorpe (Queensland), "Tea Tree" at Frazer's Island (Queensland), and "Red Gum" in Tasmania. It is called "But-but" by the aboriginals of Gippsland.

This timber is considered excellent for ships' planks; is hard, and is said to be exceedingly durable underground, and difficult to burn. It is used for sleepers, and many other purposes. (Hill.) The wood is hard, but it does not split well. It is excellent for fence posts, though inferior to *E. rostrata* in this respect. It is sometimes employed for rough kinds of furniture, as it takes the polish well.

The following samples of this timber are in the Technological Museum: 1. "Apple," or "White Gum," sandy-brown colour, coarse in the grain, shaky. (Victoria.) 2. No. 15, *London Cat.*, 1862. "Box." Diameter, 24 to 48in.; height, 50 to 90ft. "Said to be good, but certainly not equal to the other varieties of box." This is doubtless from the rough-barked variety of *E. Stuartiana.* It has a wavy brown colour, tears under the plane, and is adapted

for flooring-boards. 3. No. 32, *London Cat.*, 1862; 142, Paris Exh., 1855. "Woolly Gum" of Berrima. Diameter, 24 to 48in.; height, 40 to 80ft. "A tree often of beautiful form, but the timber weak and worthless." It is of a light, warm, wavy red colour, good to work, but full of gum-veins, and obviously not of much value. This is the smooth-barked variety of *E. Stuartiana.* Diameter, 24 to 40in.; height, 60 to 90ft.

This tree has succeeded admirably at Abbottabad, Punjab, India. (Gamble.)

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. Stuartiana*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S=\frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lb.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.12	.54	2425	1819	1.010	.850
.14	.56	2170	1627	1.001	.834

Tasmania, Victoria, New South Wales and Queensland.

324. **Eucalyptus tereticornis,** *Smith,* (Syn. *E. subulatum,* A. Cunn.; *Leptospermum umbellatum,* Gærtn.); N.O., Myrtaceæ, B.Fl., iii., 241.

Called "Red Gum," "Flooded Gum," "Grey Gum," "Blue Gum," "Slaty Gum" in New South Wales and Queensland. In Southern New South Wales it is often called "Mountain Gum." In Northern New South Wales it sometimes bears the misleading name of "Bastard Box." By the aboriginals of Northern New South Wales and Southern Queensland it is called "Mungurra," or "Mungara," and by the aboriginals of Central Queensland "Arangnulla."

Timber used in fencing, building, plough beams, poles and shafts of drays, and also in ship-building; for railway ties, cartwrights' work, telegraph poles, and largely for fencing, girders, etc., and forms a superior fuel. It is heavy and close-grained, and very much like cedar in colour.

This tree has succeeded admirably at Abbottabad, Punjab, India. (Gamble.) Timber of this species is well represented in the Technological Museum. Following are specimens (all from N.S.W.): 1. "Slaty," or "Blue Gum." Light reddish-brown, easy to dress, has seasoned only fairly well; diameter, 9in. (Tomerong, near Shoalhaven.) 2. "Slaty," or "Blue Gum." Dark red, very few gum-veins, heavy, medium to work; diameter, 18in. (Myall River, near Shoalhaven.) 3. "Grey Gum." Dark red, very heavy wood, full of gum-veins, difficult to season, very difficult to work; diameter, 15in. (Port Hacking.) 4. "Blue," or "Grey Gum." Fairly sound log, slight shakes; colour, reddish-brown; diameter, 20in. (Clarence and Richmond.) 5. This is the species referred to by Sir William Macarthur in his *Catalogue of Woods* at the Paris Exhibition, 1855 (No. 92), and the London Exhibition of 1862 (No. 19), as the "Blue Gum of Camden." In the catalogues of both exhibitions the native name in the Illawarra is given at "Tdjetlat," or "Tjellat," and also "Barroul-goura," while in the latter catalogue the name is given as "Yarrah" at Camden. "A very valuable timber, harder, tougher, more inlocked in grain, and more durable than the last (which is *E. botryoides, vide supra*), but not obtainable of nearly such large size; one of the most durable woods known; excellent for naves and felloes of wheels, and for work underground." (1855, *Cat.*) Diameter, 3 to 4ft.; height, 80 to 100ft. It is of a dark red colour, wavy, has quite a sheen, and has stripes on the end grain. It is hard and inlocked in the grain, but works remarkably well. A sample of this timber was experimented upon by Captain Fowke, R.E. (Paris, 1855). He found the specific gravity to be .843 (or weight of cubic foot, 52.54lb.), and S, 224. E is not given. 6. No. 20, London Exh., 1862; 92*b*, Paris Exh., 1855. "Blue Gum," from Appin. "Timber of excellent quality." Diameter, 36 to 48in.; height, 80 to 100ft. Of a reddish-brown colour, heavy, very cross-grained, but of excellent quality. It works freer than No. 5, and is freer from grub-holes, otherwise they are much the same. 7. No. 21, London Exh., 1862. Same name and locality as No. 6. Of a dark red colour, with cross, curly grain; a heavy timber.

8. No. 22, London Exh., 1862; 265, Paris Exh., 1855. "Blue Gum," of Berrima. Diameter, 24 to 36in.; height, 40 to 80ft. "Said to be good timber, but not to be compared with the other varieties of Blue Gum." Of a red colour, straight in the grain, and a splendid working timber. 9. No. 103, *London Cat.*, 1862. "Grey Gum," of the Clarence, of a dark red colour, fairly good to work, a heavy timber, hard and durable, valuable for building purposes.

Mr. Allen Ransome tested a sample of this timber sent from New South Wales to the Colonial and Indian Exhibition, on the planing and moulding machines, "and in all cases the results were very satisfactory."

It is to be borne in mind that this Eucalypt is closely allied, botanically, to *E. rostrata*, and the timbers of these two trees have much in common. Diameter, 18 to 36in. (exceptionally to 6ft.); height, 60 to 90ft., and exceptionally up to 150ft.

Gippsland, New South Wales and Queensland.

325. **Eucalyptus terminalis,** *F.v.M.*, (Syn. *E. polycarpa*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 257.

"Blood-wood." Called "Arang-mill" by the natives of the Dawson River, Queensland.

This interior species is, as far as the flowers go, the same as the "Blood-wood" (*E. corymbosa*) of the coast, but the bark is different, as it is far more brittle, and can scarcely be stripped in large pieces. The present species also yields but little kino, and that of obviously a different character to that yielded by *E. corymbosa.*

Timber very red, used for building purposes, slabs, posts, joists, etc. It is not highly spoken of, but it is almost the only fairly large timber available in the districts in which it grows.

South Australia, New South Wales, Queensland and Northern Australia.

326. **Eucalyptus tesselaris,** *F.v.M.*, (Syn. *E. viminalis*, Hook.; *E. Hookeri*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 251.

Commonly called "Moreton Bay Ash." By the aboriginals of the McDonnell Range (Central Australia) it is called "Ilumba," by those in

the vicinity of the Nogoa River (Queensland), "Corang." Another aboriginal name is "Carbeen."

This timber is not hard, but tough; it is excellent for building purposes. (Hill.) Comparing it with other Eucalypts it is not a durable timber; it is used for staves and flooring. It is of a dark brown colour, except near the bark. Accounts of this timber are conflicting. The Rev. J. E. Tenison-Woods states that about Moreton Bay, Gympie, etc., the wood is not valued for any purpose whatever; about Rockhampton, Mr. O'Shanesy says that the heart-wood is good enough, but the sap-wood soon decays; about Townsville and Charters Towers the wood is highly esteemed, and employed for all useful purposes. Mr. Woods says the only way to account for these various statements is by supposing the warmer climate is its proper habitat. This is by no means the only Eucalyptus timber in regard to which statements from different localities are conflicting. (*See E. Sieberiana.*)

Mr. C. Moore (*Cat. N.S.W. Timbers, Paris Exh.*, 1855) states that this tree indicates poor, sterile soil. He also states that the wood is of a perishable nature, though sometimes used in the erection of huts. Diameter, 14 to 24in.; height, 30 to 60ft.

Interior of South Australia, New South Wales, Queensland and Northern Australia.

327. **Eucalyptus viminalis**, *Labill.*, (Syn. *E. mannifera*, A. Cunn.; *E. diversifolia*, Bonpl. (the young state of *E. santalifolia*, according to F.v.M.); *E. persicifolia*, Lodd. non DC.; *E. granularis*, Sieb.; *E. pilularis*, DC. non Smith; *E. patentiflora*, F.v.M. non Miq.; *E. fabrorum*, Schlecht.; *E. Gunnii*, Miq. non Hook. f., incl. *E. dealbata*, A. Cunn.); N.O., Myrtaceæ, B.Fl., iii., 239.

The "White Gum," or "Swamp Gum" of Tasmania. About Sydney it is occasionally known as "Grey Gum." A manna exudes from the trunk, hence it is known as "Manna Gum." In Southern New South Wales it bears the name of "Ribbony Gum." In Western New South Wales it is known as "Blue Gum," and in various parts of the same colony as "Drooping Gum," "Weeping Gum," and "Woolly Butt." About the

Ovens River (Victoria) it is known as "Box," and as "Peppermint Gum." In Victoria it is called "Binnap" by the aboriginals of the Yarra.

The timber varies from a light colour to a dull brick colour; that from straight stems is employed for shingles, rails, and also as rough building material. It is not so durable as the wood of many other species of Eucalyptus, but is stronger than that of *E. amygdalina*, and *E. obliqua*. (Mueller.) It is very durable for underground work. In the extreme south of New South Wales it is used for a variety of purposes, including rails and wheelwrights' work. The heart-wood is of no use, at least in that district, so that about a foot of the centre of the tree has generally to be left as useless. The Yarra (Victoria) aboriginals used to make Geeaus (flat shields) out of this wood.

The Tasmanian wood of this species is said to afford the finest split stuff (for palings, shingles, etc.) in the world (Tenison-Woods), but Dr. Woolls says this wood is not much esteemed, probably with the meaning in Baron Mueller's remarks above, or because it is only fit to be used in the whole log, as it is apt to split, and is usually full of hollows containing gum.

At the London International Exhibition of 1862, a magnificent spar of this gum was shown from Tasmania. It was 230ft. long, and cut into 10ft. lengths. The specific gravity of this timber is about .685. A ton of dry wood yields about 3¼lb. of crude potash, or 1¾lb. of pure potash. (Mueller.) It has succeeded admirably at Abbottabad, Punjab, India. (Gamble.)

Following are brief descriptions of some timbers of this species in the Technological Museum:—

1. "Manna Gum." Warm brown colour, and coarse in grain. (Victoria.) 2. "Ribbony Gum." Straight in the grain, easy to work, coarse in grain; colour, buff; diameter, 2 to 3ft.; height, 60 to 80ft. (Delegate, N.S.W.) 3. This is also from Delegate, but from a variety of the species, as it is quite different in every respect from the normal species, "Ribbony Gum." Flesh-coloured, moderately heavy, very straight in the grain, good to work, but requires careful seasoning; diameter, 2 to 3ft; height, 60 to 80ft. 4. No. 28, London Exh., 1862; 108, Paris Exh.,

1855. "Flooded Gum" of Camden. Bentham, *Flora Australiensis*, pronounces this particular sample to belong to this species. Diameter, 36 to 48in.; height, 80 to 100ft. "A fine-looking, but comparatively worthless sort; the timber weak, and not durable." It is of a yellowish, or exceedingly pale brown colour, beautiful to work, and straight in the grain.

Following are the results of Mr. James Mitchell's experiments on samples of this wood from Tasmania (*Papers and Procs., R.S., Van Diemen's Land*, 1851). Each piece tested was 7ft. long and 2in. square. Green piece: 1. Specific gravity, .967; E, 7655760; S, 1806. 2. Specific gravity, 1.003; E, 9186912; S, 1968. A seasoned piece, "with a great portion of sap-wood," gave specific gravity .954; E, 10490860; and S, 2399. Mr. Mitchell called the timber "Ash," or "Swamp Gum."

EXPERIMENTS ON THE TRANSVERSE STRENGTH OF THE WOOD OF *E. viminalis*, by Baron Mueller and J. G. Luehmann. The specimens were 2ft. long and 2in. square.

Deflection.		Total weight required to break each piece.	Value of strength, $S = \frac{LW}{4BD^2}$	Specific Gravity.	
With the apparatus weighing 780lbs.	At the crisis of breaking.			Air-dried.	Absolutely dried.
Inches.	Inches.	Pounds.			
.12	.65	2384	1788	.954	.797
.12	.70	2195	1646	.916	.761

A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 67lb. 8oz. per cubic foot.

Has been measured with a diameter of 17ft. at base, and a height of 320ft. Ordinarily it is a very large tree.

South Australia, through Victoria to New South Wales and Tasmania.

328. **Eucryphia Moorei,** *F.v.M.*, N.O., Saxifrageæ, B.Fl., ii., 447.

"Acacia" of the colonists, as when not in flower the tree resembles some of the larger species of that genus. "Plum" of the Southern districts of New South Wales; sometimes called "Acacia Plum." Called also "White Sally."

This timber is used for the framework of buggies in the Braidwood district (New South Wales). It is a beautifully clear, moderately hard wood, of a warm, light brown colour, and free from knots. Some boards of it have been worked up under the writer's direction, and the carpenters speak in superlatives as to the facility with which it can be dressed.

Victoria and New South Wales.

329. **Eugenia cormiflora,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 284.

Wood of a dark colour, close-grained and tough. The knobby inequalities noticeable on the bark of the plank-piece are the knots from which the flowers are produced year after year. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Height, 30 to 40ft.

Queensland.

330. **Eugenia grandis,** *Wright*, (Syn. *E. cymosa*, Roxb.; *E. firma*, Wall.; *E. fortis*, F.v.M.; *Syzygium grande*, Walp.; *Jambosa grandis*, Blume.; *J. firma*, Blume); N.O., Myrtaceæ, B.Fl., iii., 285.

Wood light brown, close-grained, hard, and tough, (Kurz says it is brittle); it might serve for making staves for rum-casks; it is suitable also for building purposes. Its weight is a little over 50lb. per cubic foot. This species is not endemic in Australia.

Queensland.

331. **Eugenia Jambolana,** *Lam.*, (Syn. *E. Moorei*, F.v.M.; *Syzygium Jambolanum*, DC.); N.O., Myrtaceæ, B.Fl., iii., 283. *E. Moorei* in Muell. Cens., p. 59.

"Durobbi" of the aboriginals.

Timber flesh, or red coloured, firm, and close-grained; not much used, except for buiding purposes. It stands well in drying. It is used for building, agricultural implements, and carts, also for well-work, as it resists the action of water. Five sleepers of this wood were taken from an Indian railway in 1875. They had been in the ground five years, and were reported to be fairly sound, and not touched by white ants. Weight, about 49lb. per cubic foot. (Gamble.) Diameter, 24 to 36in.; height, 80 to 100ft.

New South Wales and Queensland.

332. **Eugenia leptantha,** *Wright*, (Syn. *Syzygium longiflorum*, Wall.); N.O., Myrtaceæ, B.Fl., iii., 283.

Wood of a dark colour, close-grained, easily worked; suitable for flooring boards of verandahs.

Queensland.

333. **Eugenia myrtifolia,** *Sims*, (Syn. *E. australis*, Wendl.; *Jambosa australis*, DC.; *J. Thozetiana*, F.v.M.; *Myrtus australis*, Hill); N.O., Myrtaceæ, B.Fl., iii., 286.

"Brush Cherry," or "Native Myrtle." Called "Red Myrtle" in Southern New South Wales.

Timber elastic; used for staves, oars, boat-building, etc. The aboriginals make boomerangs and shields from it. (*General Report, Sydney International Exhibition*, 1879.) It is of a light reddish or yellowish colour, works splendidly, seasons well, and is evidently a valuable wood. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. 12oz. per cubic foot. Diameter, 18 to 24in.; height 50 to 100ft.

New South Wales and Queensland.

334. **Eugenia Smithii,** *Poir.*, (Syn. *Acmena floribunda*, DC.; *A. elliptica*, var. G. Don.; *Myrtus Smithii*, Spreng.; *Syzygium brachynemum*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 283.

"Lilly Pilly" is the name by which this tree is commonly known. It is the "Tdgerail" of the aboriginals of Illawarra (New South Wales), and the "Coochin-coochin" of those of Queensland.

Wood close, but apt to split in seasoning. It makes good axe handles. (*General Report, Sydney International Exhibition*, 1879.) Specific gravity, .898 to .935. (Mueller.) Diameter, 1 to 3ft.; height, 80 to 120ft.

Victoria, New South Wales, Queensland and Northern Australia.

335. **Eugenia suborbicularis**, *Benth.*, N.O., Myrtaceæ, B.Fl., iii., 285.

"Oloorgo" of the Mitchell River (North Queensland) aborigines.

Wood of a dark grey colour, with peculiar corky concentric rings several inches asunder. The natives of the Johnstone River form their canoes out of the trunk of this tree. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

336. **Eugenia Ventenatii**, *Benth.*, (Syn. *Metrosideros floribunda*, Vent. non Smith; *Syzygium floribundum*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 283.

"Drooping Myrtle," or "Large-leaved Water-gum."

Wood of a grey or pinkish hue, and beautifully marked. It is close-grained, hard, heavy, and tough; it is used for tool handles, poles of drays, ribs of boats, and the flooring boards of verandahs. Diameter, 24 to 36in.; height, 40 to 60ft.

Northern New South Wales and Queensland.

337. **Eugenia Wilsonii**, *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 285.

Wood of a uniform dark brown colour, close-grained, hard, and tough; useful for tool handles.

Queensland.

338. **Eupomatia laurina**, *R.Br.*, N.O., Anonaceæ, B.Fl., i., 54.

"Rose-bush," or "Balwarra."

A small tree. The wood is soft, close, coarse-grained, and of a yellowish-brown colour. It dresses well, is not particularly handsome, and requires the most careful seasoning. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. 4oz. per cubic foot.

Victoria, New South Wales and Queensland.

339. **Euroschinus falcatus,** *Hook. f.*, N.O., Anacardiaceæ, B.Fl., i., 490.

Called "Maiden's Blush" and "Jemmy Donnelly."

This timber resembles ordinary cedar (*Cedrela australis*) in appearance, but it is woolly, difficult to work, and soon perishes on exposure. It might serve for making oars. Diameter, 36 to 48in.; height, 140 to 150ft.

New South Wales and Queensland.

340. **Evodia accedens,** *Blume*, N.O., Rutaceæ. *Euodia* in Muell. Cens., p. 13.

"Bunnec-walwal" of some Queensland aboriginals.

Wood very white, light, and soft; a good substitute for the European Lime-tree. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

341. **Evodia micrococca,** *F.v.M.*, N.O., Rutaceæ, B.Fl., i., 361.

Wood of a light yellow colour, close in the grain, and tough. Diameter, 6 to 18in.; height, 20 to 40ft.

New South Wales and Queensland.

342. **Excæcaria Agallocha,** *Linn.*, (Syn. *E. affinis*, Endl.; *Commia Cochinchinensis*, Lour.; *Stillingia Agallocha*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 152.

"River Poisonous Tree," "Milky Mangrove," "Blind your eyes," names alluding to the poisonous juice of the stem. Called "Balavola Karping" by some Queensland aboriginals.

Wood light, white, and soft; will answer for carving and marqueterie. (Thozet.) It is close-grained, and easily worked. Gamble says it is used for general carpentering purposes in India, Roxburgh, only for firewood and charcoal. It weighs about 26lb. per cubic foot. Diameter, 6 to 18in.; height, 40 to 50ft.

New South Wales, Queensland and Northern Australia.

343. **Excæcaria Dallachyana,** *Baill.*, N.O., Euphorbiaceæ, B.Fl., vi., 153.

"Scrub Poisonous Tree."

Wood yellow, with black heart, close in the grain, and very tough; might be found suitable for axe handles. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

344. **Excæcaria parvifolia,** *Muell. Arg.*, N.O., Euphorbiaceæ, B.Fl., vi., 153.

"Gutta-percha Tree" of Landsborough. "Jil-leer" of the aboriginals of the Cloncurry River (Northern Queensland).

Wood near the outside yellow, the heart dark and very beautifully marked, close-grained, and easily worked; an excellent wood for the cabinet-maker. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland and Northern Australia.

345. **Exocarpus cupressiformis,** *R.Br.*, (Syn. *Leptomeria acerba*, Sieb. non R.Br.); N.O., Santalaceæ, B.Fl., vi., 229. *Exocarpos* in Muell. Cens.

"Native Cherry." "Tchimmi-dillen" of some Queensland aboriginals. "Coo-yie" is another aboriginal name. "Ballot" of the aboriginals of Lake Condah Station (Victoria), and "Ballee" of the Yarra natives.

A close-grained and handsome wood, used for turning and cabinet purposes. It is used for tool handles, spokes, gun stocks, cornice poles, map rollers, and to a limited extent for engraving. Chairs are made in Southern New South Wales from this timber. The wood of this tree was formerly used by the Yarra (Victoria) natives for gurrecks (spear-throwers). The specific gravity of Victorian specimens is given by Baron Mueller at .756 (for a steam-dried) to .845 (for an air-dried specimen). Diameter, 6 to 9in.

(near the Victorian and New South Wales border it exceptionally grows to nearly 2ft. in diameter); height, 10 to 16ft.

All the colonies.

346. **Exocarpus latifolia,** *R.Br.*, (Syn. *E. miniata*, Zipp.; *E. luzoniensis*, Presl.; *E. ovata*, Schnitzl.); N.O., Santalaceæ, B.Fl., vi., 228.

"Broad-leaved Cherry." "Scrub Sandal-wood." "Oringorin" of some Queensland aboriginals.

The wood is very hard and fragrant, dark coloured, coarse in grain, and excellent for cabinet-work, as it takes an excellent polish. It is not endemic in Australia. Diameter, 6 to 9in.; height, 10 to 16ft.

Northern New South Wales, Queensland and Northern Australia.

347. **Exocarpus spartea,** *R.Br.*, (Syn. *E. glandulacea*, Miq.; *E. spicata*, DC.; *E. pendula*, F.v.M.); N.O., Santalaceæ, B.Fl., vi., 229.

Specific gravity of the wood, .813. (*Report, Victorian Exhibition*, 1861.)

All the colonies except Tasmania.

348. **Fagræa Muelleri,** *Benth.*, N.O., Loganiaceæ, B.Fl. iv., 368.

Wood of a yellow colour, close-grained, and hard.

Queensland.

349. **Fagus Cunninghamii,** *Hook.*, N.O., Cupuliferæ, B.Fl., vi., 210.

"Myrtle." "Evergreen Beech." "Negro-head Beech."

This wood is prized for sash and door work, and indeed all kinds of light joinery. It is a hard, richly-coloured furniture wood, and the warty protuberances on the trunk of the tree afford a most beautiful figure, as do slabs, which may be procured 6ft. long, in almost any quantity. It is used for the cogs of wheels by mill-wrights. Average specific gravity, .883. (Mueller.) Height, over 100ft. Exceptional diameter nearly 8ft., with a height of 200ft.

'BEECH" (*Fagus Cunninghamii*), EXPERIMENTED UPON BY THE VICTORIAN TIMBER BOARD, 1884.

The samples tested were each 7ft. in length by $1\frac{7}{8}$in. square; the distance between the bearings was 6ft.; and the weight was gradually applied in the centre until the sample broke.

Locality Where Grown.	Approximate Date when the Timber was Cut.	Dimensions of Tree.	Date of Testing.	Weight of each Sample in lbs.	Average Weight of Samples in lbs.	Average Weight per Cubic Foot in lbs.	Average Specific Gravity.	Total Average Specific Gravity.	Breaking Weight of each Sample in cwts. qrs. lbs.	Average Breaking Weight of Samples in lbs.	Total Average Breaking Weight.	Deflection at Point of Rupture in Inches.	Average Deflection in Inches.	Total Average Deflection in Inches.	Average Specific Strength.	Geological Formation Where the Trees grew.	Elevation above Sea-level.
Queensland *	Seasoned at least twelve months.	—	28/1/84	$6\frac{1}{4}$	6.33	37.04	0.593	0.593	6.0.21	685.3	685.3	$3\frac{1}{2}$	3.54	3.54	1871	—	—
			31/1/84	$6\frac{1}{4}$					6.0.5			$3\frac{3}{8}$					
			4/2/84	$6\frac{1}{2}$					6.0.14			$3\frac{3}{4}$					
Near Black Spur, Victorian State Forest.	19/1/83	2ft. 6in. diam.	28/1/84	8	8.00	53.69	0.750	0.861	4.2.25	595.6	548.8	$3\frac{3}{4}$	3.92	4.14	1498	Felspar Porphyry.	1600 feet.
			4/2/84	$8\frac{1}{4}$					5.2.24			4					
			4/2/84	$7\frac{3}{4}$					5.2.2			4					
Do.	—	—	24/1/84	$10\frac{3}{4}$	10.37		0.972		4.0.6	502.0		$3\frac{3}{4}$	4.37			—	—
			4/2/84	10					4.3.18			5					
Tasmania.	—	—	7/2/84	8	7.75	45.35	—	—	6.0.6	692.0	692.0	$2\frac{1}{2}$	3.12	3.12	1889	—	—
			7/2/84	$7\frac{1}{2}$					6.1.6			$3\frac{3}{4}$					

* If this locality and Botanical name are correct, then it must have been a cultivated tree, as it is not indigenous in Queensland. But the author is inclined to think that the Queensland specimen was not *F. Cunninghamii* at all, the specific gravity being so very different.

Tasmania and Victoria.

350. **Ficus Cunninghamii,** *Miq.*, (Syn. *F. Fraseri*, F.v.M.; *F. psychotriæfolia*, Miq.; *Urostigma Cunninghamii*, Miq.; *U. Fraseri*, Miq.; *U. psychotriæfolia*, Miq.); N.O., Urticeæ, B.Fl., vi., 165.

Wood of a light colour, soft, and porous. Height, about 80ft.

Queensland.

351. **Ficus glomerata,** *Willd.*, (Syn. *F. vesca*, F.v.M.; *Covellia glomerata*, Miq.); N.O., Urticeæ, B.Fl., vi., 178.

"Clustered Fig," or "Leichhardt's Clustered Fig." "Parpa" of the aboriginals.

Wood of a straw colour, coarse in grain, light, soft, and porous. It is mottled on a longitudinal section. It may answer for packing-cases. Weight, 36lb. per cubic foot, but 25lb. according to Gamble. "It is not a durable wood, though it lasts well under water, and hence is used for well frames." (Gamble, *Manual of Indian Timbers.*) Diameter, 12 to 36in.; height, 40 to 60ft.

Queensland and Northern Australia.

352. **Ficus macrophylla,** *Desf.*, N.O., Urticeæ, B.Fl., vi., 170.

"Moreton Bay Fig." "Karreuaira" and "Waabie" of the aboriginals.

This noble-looking tree has a wood which is sometimes used, though it is very difficult to season. It is used for packing-cases on the Clarence River, New South Wales. (C. Moore.) It is a softish wood, of a pale brown colour, with a beautiful wavy figure on a darker brown. This wood is so handsome when properly selected, that it is a pity that it has not other properties to recommend it. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 34lb. 1 oz. per cubic foot. Diameter, 36 to 72in.; height, 50 to 100ft.

Northern New South Wales and Queensland.

353. **Ficus platypoda,** *A. Cunn.*, (Syn. *Urostigma platypodum*, Miq.); N.O., Urticeæ, B.Fl., vi., 169.

A small robust tree. Wood soft, of a light yellow colour, with strong fibre.

Western and South Australia, Queensland and Northern Australia.

354. **Ficus pleurocarpa,** *F.v.M.*, N.O., Urticeæ, Muell. Cens., p. 22.

"Ribbed Fig."

Wood light, soft, and elastic, with very open pores. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Johnstone River (Queensland).

355. **Ficus rubiginosa,** *Desf.*, (Syn. *F. australis*, Willd.; *Urostigma rubiginosum*, Gaspar.); N.O., Urticeæ, B.Fl., vi., 168.

"Port Jackson Fig." "Narrow-leaved Fig." "Rusty Fig," or "Native Banyan." "Dthaaman" of the aboriginals.

This timber is soft, brittle, and spongy; it is, however, sometimes used for packing-cases. It is light in colour as well as in weight, and although sometimes it shows a pretty grain, it would be waste of labour to spend much time on it. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 28lb. 8oz. per cubic foot. Diameter, 4 to 5ft.; height, 60 to 80ft.

New South Wales and Queensland.

356. **Ficus scabra,** *G. Forst.*, (Syn. *F. aspera*, G. Forst.); N.O., Urticeæ, Muell. Cens., p. 22. *F. aspera* in B.Fl., vi., 174.

"Purple Fig." "White Fig." "Rough-leaved Fig." Called "Flooded Fig" on the Clarence River, N.S.W.

Both Bentham and Mueller look upon *F. aspera* and *F. scabra* merely as varieties of the same species; they only differ in opinion as to which name shall stand. Seemann (*Flora Vitiensis*) gives figures of *F. aspera* and *F. scabra* which are clearly distinct, though his illustrations may represent the most extreme forms,

connected by intermediate forms, according to the opinion of my friend, Mr. Betche. But this is somewhat uncertain, and it may also be that Seemann's statement that *F. aspera*, as figured by him with larger fruits than *scabra*, is incorrect. As far as I know, however, we have only the small-fruited form in Australia (identical with *F. scabra* of the *Flora Vitiensis*, and though it varies greatly in size and shape of the leaves, there does not appear to be any marked variation in the fruits. It is important to make this statement in regard to the synonymy of the species, as remarks about its timber appear under *F. scabra* and *F. aspera* indiscriminately.

Timber brittle and spongy; not used. It is of a yellowish colour, full of cracks, very difficult to work to a clean surface, and when that object has been attained, it is not very pretty. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 27lb. and 29lb. 1oz. per cubic foot respectively. The latter was exhibited under the name *F. muntia* (*sic.*) The wood is similar to ordinary fig timber. It is porous, of no apparent value, and displays more than an ordinary tendency to split.

Seemann (*Flora Vitiensis*) observes that the leaves of *F. aspera* are used for serving and wrapping food in Fiji, and that the leaves of *F. scabra* are used as sandpaper by the natives of Fiji, a use to which they are also put in the Clarence River district, New South Wales. Height, up to 100ft.

Victoria to Northern Australia.

357. **Flagellaria indica,** *Linn.*, N.O., Liliaceæ, B.Fl., vii., 10.

"Lawyer Vine."

The stems of this tall climber are used for walking-sticks.

North and South Queensland and Northern New South Wales.

358. **Flindersia australis,** *R.Br.*, N.O., Meliaceæ, B.Fl., i., 388.

"Flindosa," "Ash," "Crow's Ash," "Beech," "Rasp-pod," "Wyagerie," "Cugerie," or "Cudgerie" of the aboriginals of the Richmond and Clarence Rivers.

The wood is hard, close, and of great strength and durability. It has long been known to the timber merchants as being a very hard timber, and difficult to cut up with the saw, and for that reason but little attention has been paid to procuring it. (Hill.) It would make excellent timber for railway purposes, and it is not discoloured by iron; it shrinks but little in drying. It is largely used for staves in the Clarence River district. Its specific gravity has been given (Sydney Mint Experiments, 1862) at .936, which would give 58½lb. per cubic foot. Three slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 56lb. 6oz., 50lb. 1oz., and 44lb. 14oz. per cubic foot respectively. These determinations have been most carefully made, and of the identity of the woods there is no doubt. The heaviest is the darkest in colour, and has some tendency to split. The lightest in weight is also the lightest in colour, and is undoubtedly a wood of high excellence. It is perfectly homogenous, is moderately hard, and has no figure; it dresses well. The wood of medium weight came from a tree similar to the lightest one, except that it was smaller in every respect. This is the softest of the three, and but for its slight tendency to split would be preferred before that just described, as it has a neat grain, very much like oak in appearance, and looks well under polish. Diameter, 36 to 48in.; height, 80 to 100ft.

Northern New South Wales and Queensland.

359. **Flindersia Bennettiana,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 389.

"Teak," "Bulboro," or "Bulbera" of the aboriginals of Northern New South Wales. "Bogum-Bogum" of those of South Queensland.

This timber is close-grained, but seldom used. It splits well, and might probably be valuable for staves. (Moore.) It burns in a green state, and has been found a most useful timber for saddle making. (*General Report, Sydney International Exhibition*, 1879.) It is probably useful for railway-sleepers. A slab of this wood in the Technological Museum, which has been seasoned

over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. 12oz. per cubic foot. It dresses well, both on the face and end-grain, but the figure is not marked enough for it to be called a handsome wood. Diameter, 18 to 26in.; height, 70 to 90ft.

Northern New South Wales and Queensland.

360. **Flindersia Bourjotiana,** *F.v.M.*, N.O., Meliaceæ, Muell. Cens., p. 9.

Wood strong, durable, easily worked, and of a light colour.

Queensland.

361. **Flindersia maculosa,** *F.v.M.*, (Syn. *F. Strzeleckiana*, F.v.M.; *Elæodendron maculosum*, Lindl.; *Strzeleckya dissosperma*, F.v.M.); N.O., Meliaceæ, B.Fl., i., 388. (In Muell. Cens., p. 9, described as *F. Strzeleckiana*, F.v.M.)

"Spotted Tree," or "Leopard Tree." Sometimes called "Prickly Pine" in Queensland.

The timber is used for shingles, staves of tallow casks, and pick handles. (Hill.) It is of a bright yellow colour, and exceedingly tough. Unlike many other timbers in the arid western districts of New South Wales it is very elastic, and is, therefore, used for the poles and shafts of drays, buggies, etc. In the rough state (*i.e.*, with the bark on) it is used for fencing, but it is useless for building purposes, as a coleopterous insect soon destroys it. About Wilcannia, N.S.W., it is, however, considered very durable by some, when sawn and used for inside work. Diameter, 12 to 18in.; height, 36 to 40ft.

New South Wales and Queensland.

362. **Flindersia Oxleyana,** *F.v.M.*, (Syn. *Oxleya xanthoxyla*, Hook.); N.O., Meliaceæ, B.Fl., i., 389.

"Light Yellow Wood," or "Long Jack." The "Yeh" of the aboriginals of Northern New South Wales.

The timber is strong, durable, fine-grained, and of good colour; used in boat-building, cabinet-work, and for many of the purposes to which cedar is applied. (Hill.) It is a useful wood for fancy work on account of its frequently pretty yellow colour.

It is not easily attacked by ants, and is suitable for hand screw-making and buggy shafts. Diameter, 24 to 42in.; height, 80 to 100ft.

Northern New South Wales and Queensland.

363. **Flindersia Schottiana,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 388.

"Flindosy Beech," "Ash," "Stave-wood."

The timber is hard, close-grained, prettily marked, and of a pale yellow colour. It is used for shingles and staves, and for cabinet-work. Diameter, 18 to 30in.; height, 30 to 60ft.

From Hastings River, New South Wales, to Central Queensland.

364. **Frenela Endlicheri,** *Parlat.*, (Syn. *F. fruticosa*, Endl.; *F. pyramidalis*, A. Cunn.; *F. calcarata*, A. Cunn.; *Callitris calcarata*, R.Br.; *Octoclinis Backhousii*, Hill); N.O., Coniferæ, B.Fl., vi., 238. Referred to as *Callitris calcarata* in Muell. Cens., p. 109.

"Cypress Pine," "Black Pine," "Red Pine," "Scrub Pine," "Murray Pine."

This timber is an article of great importance; it is durable, fine-grained, fragrant, and capable of a high polish; it is used for piles of wharves, and for sheathing punts and boats; it resists the attacks of cobra and white ants, and the root is valued by cabinet-makers for veneering purposes. (Hill.) It is beautifully mottled and striped with black, white, and yellow; it is much used and valued in the Lachlan and Murrumbidgee districts (New South Wales) for the interior lining and roofing of houses, mantelpieces, skirting boards, etc. Slabs of the wood of this tree were used by Sir Thomas Mitchell for sleepers when crossing the Yarran Swamp.

"A coniferous wood of remarkable character, chiefly for the great size of the superbly-figured slabs that it yields under certain conditions of growth. In such specimens the heart-wood extends nearly across the bole, having a narrow white defined sap-wood. The colour is a rich brown, with large bold waves of darker brown, bold cloudiness, and nipples and ribands. This is indeed a superb

and very peculiar wood." (*Jurors' Report, London International Exhibition*, 1862.) Diameter, 18 to 24in.; height, 60 to 90ft.

Northern Victoria to Central Queensland.

365. **Frenela Macleayana,** *Parlat.*, (Syn. *Callitris Macleayana*, F.v.M.; *Otoclinis Macleayana*, F.v.M.); N.O., Coniferæ, B.Fl., vi., 235.

"Port Macquarie Pine."

Timber used for indoor purposes, for weatherboards, deals, battens, and other small scantlings. It is light and useful. Diameter, 6 to 12in.; height, 20 to 30ft.

Northern New South Wales and Queensland.

366. **Frenela Parlatorei,** *F.v.M.*, (Syn. *Callitris Parlatorei*, F.v.M.); N.O., Coniferæ, B.Fl., vi., 235.

"Mountain Cypress Pine." "Stringybark Pine."

The timber is much valued for cabinet purposes or joinery. It is of a light straw colour, fragrant, close-grained, not hard, and easily worked. Diameter, 12 to 24in.; height, 40 to 60ft.

Northern New South Wales and Queensland.

367. **Frenela rhomboidea,** *Endl.*, (Syn. *F. Ventenatii*, Mirb.; *F. australis*, Endl.; *F. arenosa*, A. Cunn.; *F. triquetra*, Spach.; *F. attenuata*, A. Cunn.; *Callitris rhomboidea*, R.Br.; *C. cupressiformis*, Vent.; *C. arenosa*, Sweet.; *C. australis*, incl. *Thuya australis*, Poir.; *Cupressus australis*, Desf.); N.O., Coniferæ, B.Fl., vi., 237. Referred to in Muell. Cens., p. 109, as *Callitris cupressiformis*.

"Cypress Pine." "Light Pine" of Western New South Wales. "Illawarra Mountain Pine." "Brorogery" of the aboriginals of Queensland. The "Oyster Bay Pine" of Tasmania.

The timber is much used for telegraph posts, and by settlers for building purposes. (Hill.) It is strong, durable, and close-grained. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 39lb. 5oz. per cubic foot. Diameter, 12 to 18in.; height, 40 to 50ft.

South Australia to Southern Queensland.

368. **Frenela robusta,** *A. Cunn.*, (Syn. *F. propinqua*, A. Cunn.; *F. glauca*, R.Br.; *F. crassivalvis*, Miq.; *F. canescens*, Parlat.; *F. Gulielmi*, Parlat.; *Callitris robusta*, R.Br.; *C. propinqua*, R.Br.; *C. glauca*, R.Br.; *C. Preissii*, Miq.); N.O., Coniferæ, B.Fl., vi., 237. Described in Muell. Cens., p. 109, as *Callitris verrucosa*. (See var. *verrucosa*.)

"Black Pine," or "Dark Pine," of Western New South Wales. "White," or "Common Pine." "Murrumbidgee," or "Lachlan Pine." Called also "Camphor-wood." "Marung" of the aboriginals of the Lake Hindmarsh Station (Victoria).

This wood is used very generally in the southern and western districts of New South Wales for flooring and weatherboards, joists, ceilings, tables, and all sorts of furniture. It is very full of knots, but polishes well, and shows to advantage. It is fragrant, having a somewhat camphoraceous odour, varies much in colour from a light to a dark brown, with often pinkish longitudinal streaks, is often full of beautiful markings, is very durable, is in use for piles and sheathing of boats, as it resists, to a great extent, the attacks of the *Teredo* and white ants. Altogether, it is an excellent wood. The variation in colouring of the timber is emphasized by the names "Light Pine" and "Black Pine," both of which are in use in the western districts, applied to this species.

Some samples of this timber, sent from Queensland to the Colonial and Indian Exhibition, were thus reported on by Mr. Allen Ransome: "This wood varies in colour from a light to a dark brown; it is straight-grained, durable, beautifully figured, and easy to work. The wood worked admirably under the action of the cutters, which left a perfectly smooth and glossy surface. It shrinks and warps but little in seasoning."

"*Cypress Pine.*—At a meeting of the N.S.W. Commission for the Melbourne Centennial Exhibition, held yesterday, the importance of having the Cypress, or Murray pine timber, prominently exhibited in the coming exhibition at Melbourne, was referred to. A sample of black pine, which takes a beautiful polish, was shown, and the statement made that this timber is the only one which is known to resist the attacks of the white ant. For this valuable quality it was sent some fifteen months ago to Port Darwin

for building the railway residences and stations on the Trans-continental Railway between Port Darwin and Adelaide, after being properly tested by the S.A. Government to prove its white-ant resisting qualities. Not only was the timber shipped for the frames and flooring of the buildings, but the pine was made up into joinery (doors and casements) and office furniture by one of our leading joinery firms here, with good effect. The many knots in this class of pine is no detriment to its usefulness, as they do not fall out, and when the wood is polished they give it a handsome appearance. We have learned that what promised to be an important trade with the Northern Territory and with the islands in the Straits, by supplying this white-ant resisting timber from our large forests near Junee and Narandera, and also in the north, near Tamworth, was destroyed by the cost of the timber being excessive through high rail carriage to Sydney, and having to send by steamers to the northern ports; and the contractors for the Port Darwin Railway, after trying to get a reduction in the railway freight to Sydney (almost equal to the first cost of the timber), fell back upon islands in the Straits for their supplies."—Sydney *Evening News*, 28th February, 1888. It is highly probable that the pine alluded to is referable to this species. Diameter, 18 to 24in.; height, 60 to 70ft.

Northern Australia, through Queensland, all round the continent to North-west Australia.

369. **Frenela robusta,** var. **microcarpa,** *A. Cunn.*, (Syn. *F. microcarpa*, A. Cunn.; *F. intratropica*, F.v.M.; *F. columellaris*, F.v.M.; *F. Moorei*, Parlat.; *Callitris columellaris*, F.v.M.); N.O., Coniferæ, B.Fl., vi., 237. *Callitris columellaris* in Muell. Cens., p. 109.

"White Pine," "Cypress Pine," "Coorung-coorung" of the aboriginals of Northern New South Wales. "Pooragri" of those about Brisbane. "Coolooli" of those about Wide Bay (Queensland).

Timber brittle, soft, dark-coloured, fragrant, and silky; used for indoor work, and the root-stock for turning and veneers. "Used for telegraph poles." (Thozet.) It is also used for the

piles of wharves, and the sheathing of boats, as it resists the attacks of the *Teredo.* Diameter, 18 to 20in.; height, 60 to 70ft.

New South Wales and Queensland.

370. **Frenela robusta,** var. **verrucosa,** *A. Cunn.*, (Syn. *F. verrucosa*, A. Cunn.; *F. tuberculata*, R.Br.; *Callitris verrucosa*, R.Br.; *C. tuberculata*, R.Br.); N.O., Coniferæ, B.Fl., vi., 237. Included under *Callitris verrucosa*, Muell. Cens., p. 109.

"Cypress Pine" of the Richmond and Clarence Rivers. "Camphor-wood." It is known as "Rock Pine" in Western New South Wales.

This tree yields a beautiful dark wood, suitable for cabinet-making. It has a peculiar odour, from which circumstance it is sometimes called "Camphor-wood," and it is said to be obnoxious to insects. A sample of this timber was exhibited at the London International Exhibition of 1862, and the figure was described by the Jurors as "of extraordinary beauty." It is useful for telegraph posts. "Specific gravity, .691; weight of cubic foot of dried wood, about 43lb. (Mueller.) A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), under the name of *F. verrucosa* var. *lævis*, has a weight which corresponds to 44lb. 7oz. per cubic foot.

Northern New South Wales and Queensland.

371. **Fusanus acuminatus,** *R.Br.*, (Syn. *Santalum acuminatum*, A. DC.; *S. Preissianum*, Miq.; *S. cognatum*, Miq.); N.O., Santalaceæ, B.Fl., vi., 215. (Described in Muell. Cens., p. 64, as *Santalum acuminatum.*)

"Bitter Quandong," "Native Peach." "Gutchu" of the aboriginals of the Lake Hindmarsh Station (Victoria).

Timber hard and close-grained, and emitting a very pleasant fragance when freshly cut or re-worked, sap-wood of a creamy-pink, heart-wood flesh coloured. It works splendidly, and is excellent for cabinet-work. It takes a fine polish. Specific gravity, .828.

This being one of the woods by which the aboriginals of the interior districts of New South Wales obtain fire, an account of the method adopted by the natives of the Lachlan River, New South Wales, to secure this may not be uninteresting. Two pegs

are driven firmly into the ground about a foot apart, a slotted piece of Quandong wood is then placed against these pegs, a small wedge is tapped lightly into the groove to keep it open, and some finely rubbed dry grass or bark fibre is placed in the groove or slot, the native then sits down on the ground, and placing his heels against the grooved piece opposite the pegs, holds it firmly in position, and with a piece of Quandong wood shaped like a paper-knife, rubs quickly and heavily across the groove where the grass, etc., has been placed. The friction soon produces combustion of the grass; the wedge is then tapped in order to open the groove wider, the smouldering grass is shaken out into a ball of dry grass ready for the purpose, and the whole waved backwards and forwards for a minute or two until the flame is produced.

An account of a slightly different method of generating fire, as practised by the aboriginals of Western New South Wales, is given by P. Beveridge (*Proc. R.S., N.S.W.*, 1883, p. 67). For an account of a microscopical examination of the wood, with drawings, see *Pharm. Journ.* [3], xvi., 759. Height, 20 to 30ft.

Queensland, New South Wales to Western Australia.

372. **Fusanus persicarius**, *F.v.M.*, (Syn. *Santalum persicarium*, F.v.M.); N.O., Santalaceæ, B.Fl., vi., 216.

"Native Sandal-wood."

A tall shrub or small tree, yielding a kind of sandal-wood. Specific gravity, .749, according to one experiment by Mr. Osborne.

All the colonies except Tasmania.

373. **Fusanus spicatus**, *R.Br.*, (Syn., *Santalum spicatum*, A.DC.; *S. cygnorum*, Miq.); N.O., Santalaceæ, B.Fl., vi., 217. (Described in Muell. Cens., p. 64, as *Santalum cygnorum*.)

"Fragrant Sandal-wood." (The fragrance is but slight.)

This sandal-wood forms an important article of export from Western Australia, the amount exported in 1884 being valued at £29,960, of which this wood formed a considerable portion. China is the chief market for it.

In 1849, 1,204 tons of Sandal-wood, valued at £10,711, were shipped from Western Australia. The merchants bought it for

shipment at £6 to £6 10s. per ton. Now, the Sandal-wood trees of any size within a radius of 150 miles of Perth have been cut down, and little can be obtained, except at a great distance. In 1876, 7,000 tons were exported, of the estimated value of £70,000. The amount exported in 1879 (chiefly to China and Singapore) was 4,700 tons, valued at £47,000. (See also *Fusanus*.)

At the London International Exhibition of 1862, a fine log of sandal-wood, weighing 4½cwt., was shown from the Blackwood River, Western Australia; and another, 3ft. 6in. long, by 11in. diameter, from York. Height, up to 30ft.

Southern and Western Australia.

374. **Garuga floribunda,** *DC.*, N.O., Burseraceæ, B.Fl., i., 377.

Wood tough, close-grained, firm, and easy to work; colour, grey. This plant is not endemic in Australia.

Northern Australia.

375. **Geijera Muelleri,** *Bentham*, (Syn. *Coatesia paniculata*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 364.

"Balsam of Copaiba," or "Capivi Tree."

The timber is nicely marked, and of an agreeable fragrance when green. (Hill.) It has a beautiful, dark-clouded heart-wood, the rest of a light colour, all hard and close-grained, and would suit well for cutting into veneers for cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) Diameter, 12 to 13in.; height, 40 to 60ft.

Queensland.

376. **Geijera parviflora,** *Lindl.*, (Syn. *G. pendula*, Lindl.); N.O., Rutaceæ, B.Fl., i., 364.

"Wilga," adopted by the colonists from the aboriginal name. Called also "Dogwood" and "Willow."

The timber is light-coloured, hard, close-grained, and has an agreeable fragrance; it is, however, apt to split in seasoning, and is liable to gum-veins. It is used for the naves of wheels, blocks, etc. Mr. G. S. Home, however, calls it a useless timber, and says the trees cannot be killed by ringing. Diameter, 6 to 12in.; height, 20 to 30ft.

All the colonies except Tasmania.

377. **Geijera salicifolia,** *F.v.M.*, (Syn. *G. latifolia*, Lindl.) ; N.O., Rutaceæ, B.Fl., i., 364.

"Balsam of Copaiba Tree" (the name given on account of the taste of the bark). "Wilga" is a common name. Called "Koko" by some Queensland aboriginals.

Wood close, tough, firm, light brown in colour, and nicely marked. It may be found useful for wood-engraving. It has no dark heart-wood. It polishes fairly well, but it is apt to split, and is somewhat difficult to dress down to an absolutely even surface. It is rather heavy.

Mr. G. S. Home informs me that in the Lachlan district this timber is not considered to have any economic value, but it is a handsome tree, with long leaves and pendent branches. It is said to be the only tree in the district that ants will not climb, consequently a workman, where possible, always leaves his swag on its branches, and it remains free from their attacks. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 59lb. 5oz. per cubic foot. Diameter, 10 to 15in.; height, 30 to 40ft.

New South Wales and Queensland.

378. **Gmelina Leichhardtii,** *F.v.M.*, (Syn. *Vitex Leichhardtii*, F.v.M.; and (?) *Tectona australis*, Hill); N.O., Verbenaceæ, B.Fl., v., 66.

"Beech," or "White Beech." "Binburra" of the aboriginals of Northern New South Wales; "Cullonen" of those of Queensland.

A very useful timber, strong, durable, and easily worked; it does not expand in damp, or contract in dry weather, if moderately seasoned, hence it is much prized for the decks of vessels and the flooring of verandahs. It is light coloured, and is useful for turning. "It is now cultivated in Queensland for commercial purposes." (Mueller.) It is close-grained, and not easily attacked by white ants.

Speaking of this wood, Mr. W. Bäuerlen writes to me: "I have just seen a staircase, and eleven months ago the tree from which the wood was taken was growing in a forest. It was cut

and worked at once, green as it was, and up to the present no sign of shrinking or cracking can be seen." It warps neither in plank nor in log. It is used also for floats of mill wheels. It works excellently, and though plain, and not very ornamental, it is one of the most useful of Australian timbers. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 36lb. per cubic foot. Diameter, 24 to 42in.; height, 80 to 120ft.

New South Wales and Queensland.

379. **Gmelina macrophylla,** *Benth.*, (Syn. *Vitex macrophylla*, R.Br.; *V. Dalrympleana*, F.v.M.; *Ephielis simplicifolia*, Seem.); N.O., Verbenaceæ, B.Fl., v., 65.

"A tall tree." Wood close-grained, the outer, or sap-wood, prominently marked, of a pretty purple colour, the rest grey; a useful timber for flooring boards and planking, the timber closely resembling that of *G. Leichhardtii.* (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland and Northern Australia.

380. **Graptophyllum Earlii,** *F.v.M.*, (Syn. *Earlia excelsa*, F.v.M.; *Thyrsacanthus Earlii*, F.v.M.); N.O., Acanthaceæ, B.Fl., iv., 551.

This is probably the largest tree in this natural order. Wood flesh coloured, becoming brown towards the centre, very hard, tough, and close-grained. Diameter, 3 to 6in.; height, 15 to 25ft.

Queensland.

381. **Grevillea gibbosa,** *R.Br.*, (Syn. *G. glauca*, Knight); N.O., Proteaceæ, B.Fl., v., 463.

A tree of very variable size. Wood dark-brown, prettily marked, close-grained, and hard; of a greasy nature, which prevents it showing well when polished. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Northern Australia and Queensland.

382. **Grevillea Hilliana,** *F.v.M.*, N.O., Proteaceæ, B.Fl., v., 463.

"Silky Oak." "White Yiel Yiel."

Timber hard, durable, and beautifully grained; used for coopers' work, cabinet-work, veneers, etc. Diameter, 2 to 3ft.; height, 50 to 60ft.

Northern New South Wales and Queensland.

383. **Grevillea polystachya,** *R. Br.*, (Syn. *G. parallela*, Knight; *G. polybotrya*, F.v.M.); N.O., Proteaceæ, B.Fl., v., 459.

Wood red, hard, close-grained, and durable, prettily marked, suitable for cabinet-work. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Height, about 30ft.

Queensland and Northern Australia.

384. **Grevillea robusta,** *A. Cunn.*, (Syn. *G. umbratica*, A. Cunn.); N.O., Proteaceæ, B.Fl., v., 459.

"Silky Oak." "Warra-garria" of the aboriginals of the Richmond and Clarence Rivers; "Tuggan-tuggan" of those of Queensland.

The wood is extensively used for the staves of tallow casks, and is, in consequence, becoming scarce. It is much in repute for cabinet-work and lining of houses. It is elastic and durable. The tree resists drought in a remarkable degree. (Mueller.) Of all the Australian trees grown on Ceylon estates *Grevillea robusta* seems the most promising. (*Tropical Agriculturalist*, Dec., 1885.)

Although distinctly a pretty wood, yet on account of its lightness of colour it has not the same richness of appearance of many other Proteaceous timbers. It is moderately hard, and works well. Where knots are present, they are not "dead" or loose, but are themselves prettily marked, and add much to the beauty of polished specimens of the wood. Two slabs of this wood in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 38lb. 14oz. and 36lb. 2oz. respectively per cubic foot. In the Sydney Mint experiments, 1860, the specific gravity is given at .564, equivalent to a weight of 35lb. 4oz. per cubic foot. Diameter, 24 to 36in.; height, 70 to 80ft.

New South Wales and Queensland.

385. **Grevillea striata,** *R.Br.*, (Syn. *G. lineata*, R.Br.); N.O., Proteaceæ, B.Fl., v., 462.

"Beef-wood" and "Silvery Honeysuckle." The "Turraie" of some Queensland aboriginals.

The timber is hard, close-grained, and prettily marked; it takes a good polish, and is used for furniture, cabinet and fancy work, fencing, etc. It takes its vernacular name from its resemblance to raw beef. About Wilcannia, New South Wales, it is considered the very best in the district for furniture and fencing posts. It lasts well in the ground when split, but not in round posts. Diameter, 18 to 20in.; height, 40 to 50ft.

South Australia, New South Wales, Queensland and Northern Australia.

386. **Grewia latifolia,** *R.Br.*, (Syn. *G. Richardiana*, Hook.); N.O., Tiliaceæ, B.Fl., i., 271.

Wood hard, close-grained, and takes a good polish. Diameter, 6 to 8in.; height, 10 to 20ft.

New South Wales and Queensland.

387. **Guettardella (Guettarda) putaminosa,** *F.v.M.*, (Syn. *Bobea putaminosa*, F.v.M.; *Timonius putaminosus*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 419.

Wood of a light-yellowish colour, quite equal to Box; the grain is close, and it may prove suitable for engraving. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

388. **Guettardella (Guettarda) speciosa,** *Linn.*, (Syn. *Cadamba jasminiflora*, Sonn.); N.O., Rubiaceæ, B.Fl., iii., 419.

"A coarse shrub, attaining 5 or 6ft." The wood is yellow, with a tinge of red. The weight of an Andaman Islands specimen gave 49lb. per cubic foot. (Gamble.)

Queensland and Northern Australia.

389. **Gyrocarpus Jacquini,** *Roxb.*, (Syn. *G. americanus*, Jacq.; *G. asiaticus*, Willd.; *G. acuminatus*, Meissn.; *G. sphenopterus*,

R.Br.; *G. rugosus,* R.Br.); N.O., Combretaceæ, B.Fl., ii., 505. *G. americanus* in Muell. Cens., p. 51.

"A tall tree." The wood is very light, soft, and white, and is much used in parts of India for making light boxes and toys; it takes paint and varnish well. It is preferred before all other woods for making catamarans. (Roxburgh.) In old trees the heart of the trunk is often found decayed, after the manner of willows. The weight is 23lb. per cubic foot. (Gamble.)

Queensland and Northern Australia.

390. **Hakea dactyloides,** *Cav.,* (Syn. *H. nervosa,* Knight; *H. ferruginea,* Lodd.; *Banksia dactyloides,* Gærtn.; *B. oleifolia,* Salisb.; *Conchium dactyloides,* Vent.; *C. nervosum,* Smith); N.O., Proteaceæ, B.Fl., v., 524.

Occasionally called "Turmeric."

Timber hard and close-grained; used for cabinet-work and turnery, but is usually but a shrub. Diameter, 9in.; height, 30 to 40ft.

New South Wales and Queensland.

391. **Hakea leucoptera,** *R.Br.* (For botanical synonyms see p. 34.) N.O., Proteaceæ, B.Fl., v., 515.

"Pin Bush," "Needle Bush," "Water Tree," and "Beef-wood."

This timber is coarse-grained and soft; it takes a good polish, and is sometimes used for tobacco pipes, veneers, etc. Specific gravity, .818. (Mueller.) Mr. G. S. Home also directs my attention to the use of this timber out west for tobacco pipes, cigarette holders, etc., it being considered particularly good for this purpose. Diameter, 4 to 6in.; height, up to 25ft.

All the colonies except Tasmania and Western Australia.

392. **Hakea lorea,** *R.Br.,* (Syn. *Grevillea lorea,* R.Br.); N.O., Proteaceæ, B.Fl., v., 496.

Called "Cork Tree" in the interior, in allusion to its rugged bark.

This interior tree is rather rare, but the timber is much prized for bullock yokes, being very strong and durable.

New South Wales, Queensland and Northern Australia.

393. **Hakea pedunculata,** *F.v.M.*, N.O., Proteaceæ, Melbourne *Chemist and Druggist*, July, 1883.

Wood dark brown, close in the grain, hard, and nicely marked. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Endeavour River, Queensland.

394. **Halfordia drupifera,** *F.v.M.*, N.O., Rutaceæ, Muell. Cens., p. 12.

" Boogogin" of the aboriginals of Northern New South Wales.

This wood is yellow, hard, tough, and durable. Diameter, 18 to 24in.; height, 90 to 100ft.

New South Wales and Queensland.

395. **Harpullia pendula,** *Planch.*, N.O., Sapindaceæ, B.Fl., i., 471.

"Tulip-wood." "Mogum-mogum" of the aboriginals of Northern New South Wales.

The wood is close-grained, firm, and beautifully marked with different shades from black to yellow, and, therefore, much esteemed for cabinet-work. It is also possibly a useful wood for engraving. The outer, or lighter coloured wood is very tough and easily worked. It is said to be the best in Australia for lithographers' scrapers. Diameter, 14 to 24in.; height, 50 to 60ft.

Northern New South Wales and Queensland.

396. **Hedycarya angustifolia,** *A. Cunn.*, (Syn. *H. Cunninghamii*, Tulasne; *H. dentata* var. *australasica*, Sond.; *H. australasica*, A.DC.; *H. pseudomorus*, F.v.M.); N.O., Monimiaceæ, B.Fl., v., 291. *H. Cunninghamii* in Muell. Cens., p. 3.

"Native Mulberry," "Smooth Holly." Formerly called "Djelwuck" by the Yarra (Victoria) aboriginals.

" A tall shrub or small tree." The wood is very light, close-grained, and tough. It is quite fit for cabinet-work. Mr. Bäuerlen reports: "I have learnt from some aborigines (Southern New South Wales) that this wood was preferred by them and their forefathers to any other for the purpose of obtaining fire by friction." Mr. Brough Smyth has anticipated this (p. 34, *Proc. R.S. Victoria*, Vol. vi., 1861-4). He exhibited some fire-sticks

from the Western Port Ranges of Victoria, and said: "Fire is produced by laying one piece of wood against the other at right angles and twisting it rapidly. Fire is sometimes obtained in thirty seconds." The aboriginals also use it for spear-ends.

Victoria, New South Wales and Queensland.

397. **Helicia ferruginea,** *F.v.M.*, N.O., Proteaceæ, B.Fl., v., 405.

"A moderate-sized tree." Wood of a pinkish colour, nicely marked, close-grained; will be useful to coopers as well as to cabinet-makers. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Northern New South Wales and Queensland.

398. **Hemicyclia australasica,** *Muell. Arg.*, (Syn. *H. sepiaria* var. *australasica,* F.v.M.); N.O., Euphorbiaceæ, B.Fl., vi., 118.

Timber hard, firm, and close-grained; probably of use for turnery and wood-engraving. It is yellow when fresh, turning to greyish-yellow when dried. Diameter, 18 to 24in.; height, 40 to 50ft.

Northern New South Wales and Queensland.

399. **Heritiera littoralis,** *Dryand.*, (Syn. *H. minor,* Lam.); *Balanopteris Tothila,* Gærtn.; *B. minor,* Gærtn.); N.O., Sterculiaceæ, B.Fl., i., 231.

"Red Mangrove" of Queensland. "Sundri" of India. The "Looking-glass Tree" of English gardeners.

"A tree attaining a considerable size." Wood firm, close-grained, of a dark colour. (Kurz, however, speaks of it as rather light and loose-grained.) Gamble gives its weight at 65lb. per cubic foot when dry, and Schlich at as much as 102lb. when wet. It is durable, and extremely tough. It is used in India for a great variety of purposes, such as beams, buggy shafts, planking, posts, furniture, firewood, but chiefly in boat building, for which purpose it is very extensively used in Calcutta. (Gamble.)

Queensland and Northern Australia.

400. **Hernandia bivalvis,** *Benth.*, N.O., Laurineæ, B.Fl., v., 314.

"Grease Nut." "Cudjerie" of the aboriginals.

Wood of a dark grey colour, grain close, light, and soft; suitable for carriage brakes, lining boards, and similar uses. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

401. **Heterodendron diversifolium,** *F.v.M.*, N.O., Sapindaceæ, B.Fl., i., 469.

Wood of a reddish colour, and finely grained. Its great strength renders it fit for pick handles. (Hill.) It is of a lovely dark rosewood colour. Diameter, 3 to 8in.; height, 6 to 8ft.

New South Wales and Queensland.

402. **Heterodendron oleæfolium,** *Desf.*, N.O., Sapindaceæ, B.Fl., i., 469.

"Emu Bush." "Jiggo" of the Murrumbidgee aboriginals (New South Wales). "Behreging" of some other aboriginals.

A tall shrub. Timber very hard and heavy; used for rollers and rolling pins. It is of a yellowish colour, with a black or dark brown heart. It might be suitable for wood-engraving. Specific gravity of wood, .858. (Mueller.)

All the colonies except Tasmania.

403. **Hibiscus heterophyllus,** *Vent.*, (Syn. *H. grandiflorus*, Salisb.); N.O., Malvaceæ, B.Fl., i., 212.

"Green Kurrajong." "Dtharang-gange" of some New South Wales aboriginals.

A tall shrub. Wood a pale yellow colour, and with open grain, smooth, and tough; suitable, probably, for making musical instruments, as it is a good conductor of sound. (*Cat. Queensland Woods, Ind. and Col. Exh.*, 1886.) It is a most inferior wood. It blackens with age, warps and splits greatly, is very porous, and has no figure. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 28lb. 7oz. per cubic foot.

New South Wales and Queensland.

404. **Hibiscus tilaceus,** *Linn.*, (Syn. *Paritium tilaceum*, St. Hil.); N.O., Malvaceæ, B.Fl., i., 218.

"Cotton Tree." "Talwalpin" of the aboriginals.

A small tree. Wood close-grained; colour, invisible (*sic*) green; beautifully marked, easy to work, and takes a good polish; supposed by some to resemble Pollard Oak. (*Cat. Queensland Woods, Ind. and Col. Exh.*, 1886.) It is not used in India except for fuel. Weight, 35 to 38lbs per cubic foot. (Gamble.)

New South Wales, Queensland and Northern Australia.

405. **Hodgkinsonia ovatiflora,** *F.v.M.*, N.O., Rubiaceæ, B.Fl., 420.

"Larribie" of the aboriginals of the Richmond and Clarence Rivers (New South Wales).

Wood firm, close-grained, pretty, and light coloured to white. Some specimens remind one of Boxwood, except that they are more dead-looking than that wood. It is a very nice wood to work, but has no figure to speak of. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 45lb. 11oz. per cubic foot. Diameter, 6 to 12in.; height, 12 to 16ft.

New South Wales and Queensland.

406. **Homalium vitiense,** *Benth.*, (Syn. *H. alnifolium*, F.v.M.); N.O., Samydaceæ, B.Fl., iii., 310.

Wood white, close-grained, and durable; may prove useful for wheelwrights' work. (Thozet.) Diameter, 12 to 24in.; height, 50 to 70ft.

Queensland.

407. **Hormogyne cotinifolia,** *A. DC.*, (Syn. *Sersalisia cotinifolia*, F.v.M.); N.O., Sapotaceæ, B.Fl., iv., 284.

"A straggling, or diffuse shrub." Wood of a dark yellow colour, close in the grain, and very hard. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1885.)

New South Wales and Queensland.

408. **Hovea acutifolia,** *A. Cunn.*, N.O., Leguminosæ, B.Fl., ii., 174.

A tall shrub. Wood close-grained, yellow, and firm.

New South Wales and Queensland.

409. **Hovea longipes,** *Benth.*, (Syn. *H. leiocarpa*, Benth.); N.O., Leguminosæ, B.Fl., ii., 174.

A tall shrub. Wood of a dark yellow colour, close-grained, and very hard.

Northern New South Wales and Queensland.

410. **Hymenanthera dentata,** *R.Br.*, (Syn. *H. Banksii*, F.v.M.); N.O., Violaceæ, B.Fl., i., 104.

A shrub. The wood is of a bright yellowish colour, and exceedingly hard. It somewhat resembles ordinary Boxwood in appearance.

Tasmania, Victoria and New South Wales.

411. **Hymenosporum flavum,** *F.v.M.*, (Syn. *Pittosporum flavum*, Hook.); N.O., Pittosporeæ, B.Fl., i., 114.

"Wollum-wollum" of the aboriginals of Northern New South Wales.

Timber close-grained, and firm, but easily wrought. It will, perhaps, be useful for wood-engraving. Diameter, 18 to 24in.; height, 50 to 60ft.

New South Wales and Queensland.

412. **Ixora Timorensis,** *DC.*, (Syn. *I. Klanderiana*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 415.

Wood of a light colour, close in the grain, hard, and tough. It is not endemic in Australia.

Queensland and Northern Australia.

413. **Jacksonia scoparia,** *R.Br.*, (Syn. *J. macrocarpa*, Benth.; *Viminaria laterifolia*, Link.); N.O., Leguminosæ, B.Fl., ii., 59.

"Dogwood." "Mountangarra" of some Eastern Australian aboriginals.

This wood emits a most offensive odour when burning, hence its vernacular name. Only timber of very small diameter can be obtained, and even this is usually rent and shaken. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 55lb. 4oz. and 56lb. 7oz. respectively per cubic foot. It is of a dark yellowish or brown colour, and polishes very well. This tree is an indication of poor soil. Diameter, 3 to 4in.; height, 10 to 12ft.

New South Wales and Queensland.

414. **Kentia minor,** *F.v.M.*, (Syn. *Bacularia minor*, F.v.M.); N.O., Palmæ, B.Fl., vii., 137.

The stems are in repute for walking-sticks. Diameter, ½in.; height, 5 or 6ft.

Queensland.

415. **Kentia monostachya,** *F.v.M.*, (Syn. *Areca monostachya*, Mart.; *Linospadix monostachyus*, Wendl.; *Bacularia monostachya*, F.v.M.); N.O., Palmeæ, B.Fl., vii., 136. *Bacularia monostachya* in Muell. Cens., p. 120.

"Walking-stick Palm."

This slender palm is much in request for walking canes and umbrella handles. Diameter, 1 to 2in.; height, 6 to 12ft.

Northern New South Wales and Queensland.

416. **Kermadecia pinnatifida,** *Bail.*, N.O., Proteaceæ, *Cat. Queensland Woods, Col. and Ind. Exh.*, 1886. (Bailey.)

Wood of a pinkish colour, close in grain, and very prettily marked; useful to coopers and cabinet-makers. *(Cat. Queensland Woods.)*

Johnstone River, Queensland.

417. **Kibara longipes,** *Benth.*, (Syn. *Mollinedia longipes*, F.v.M. non Benth.); N.O., Monimiaceæ, B.Fl., v., 289. *Mollinedia longipes* in Muell. Cens., p. 3.

"A tree of considerable size." Wood straw coloured, close in grain, hard, and nicely marked. (*Cat. Queensland Woods, Col and Ind. Exh.*, 1886.)

Queensland.

418. **Kunzea peduncularis**, *F.v.M.*, (Syn. *K. leptospermoides* F.v.M.; *Bæckea phylicoides*, A. Cunn.); N.O., Myrtaceæ B.Fl., iii., 115.

"Mountain Tea-tree." Formerly called "Burgan" by the Yarra (Victoria) aboriginals.

The wood of this small tree was used by the Yarra (Victoria) aboriginals for goyjums (kangaroo spears), breapang or warra warras (fighting-sticks with bead-ends), gudjerons (waddies or clubs), wankins (fighting boomerangs).

Victoria and New South Wales.

419. **Lagerstrœmia Archeriana**, *Bail.*, Syn. *Queensland Flora* (Bailey); N.O., Lythrarieæ.

Wood firm, and of a brown colour.

Palmer River, Queensland.

420. **Lagunaria Patersoni**, *Don.*, N.O., Malvaceæ, B.Fl., i., 218.

"Tulip Tree." "White Oak." "White Wood."

Timber white, close-grained, easily worked, and used for building purposes. Diameter, 18 to 30in.; height, 40 to 60ft.

New South Wales and Queensland.

421. **Laportea gigas**, *Wedd.*, (Syn. *Urtica gigas*, A. Cunn. *Urera rotundifolia*, Wedd.; *U. excelsa*, Wedd.); N.O., Urticeæ, B.Fl., vi., 191.

"Giant Nettle Tree." "Irtaie" of the aboriginals of the Richmond and Clarence Rivers (New South Wales). "Goo-mao-mah" of those of Queensland.

Wood spongy, brownish, soft, and of no use. It can be torn away with the finger-nail with the greatest facility, and nothing approaching a smooth surface can be given to it. The same remarks apply to *L. photiniphylla*. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of

1862), have weights which correspond to 16lb. 4oz. and 17lb. 10 oz. respectively per cubic foot. Height, 80 to 100ft.

New South Wales and Queensland.

422. **Laportea photiniphylla,** *Wedd.*, (Syn. *Urtica photiniphylla*, A. Cunn.; *Fleurya photiniphylla*, Kunth); N.O., Urticeæ, B.Fl., vi., 192.

"Small-leaved Nettle."

Wood very soft and brownish. It might possibly be utilized for floats for fishing-nets. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 13lb. 14oz. per cubic foot. Height, about 60ft.

New South Wales and Queensland.

423. **Leptospermum abnorme,** *F.v.M.*, (Syn. *Kunzea brachyandra*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 109.

A tall shrub. Wood of a dark colour, hard, heavy, and close-grained.

New South Wales, Queensland and Northern Australia.

424. **Leptospermum flavescens,** *Smith*, (Syn. *L. polygalifolium*, Salisb.; *L. Thea*, Willd.; *L. tuberculatum*, Poir.; *Melaleuca trinervia*, White; *M. Thea*, Wendl.); N.O., Myrtaceæ, B.Fl., iii., 104.

"Tea-tree." A name given more or less to species of this genus, though not to this genus alone.

Wood hard and close-grained, tough, and light coloured. This species is not endemic in Australia. Diameter, 5 to 8in.; height, 15 to 20ft.

All the colonies except South and Western Australia.

425. **Leptospermum lanigerum,** *Smith*, (Syn. *L. australe*, Salisb.; *Melaleuca trinervia*, White); N.O., Myrtaceæ, B.Fl., iii., 106.

"Tea-tree" (from the leaves having been used as a substitute for tea by Captain Cook's sailors). "Woolerp," or "Woolip" of the aboriginals of Coranderrk Station (Victoria). "Punnun" of those of Lake Condah.

A tall shrub or small tree. The wood is hard, heavy, and durable when not exposed to atmospheric influences. The natives of the Port Lincoln district (S.A.) used to make spear handles of the stems of species of *Leptospermum*. They would heat them in hot ashes, then bend and sharpen them. (Wilhelmi, *Proc. R.S., Vict.*, 1860, p. 169.) The Yarra (Victoria) blacks used to make goyjums (kangaroo spears) of this wood.

All the colonies except Western Australia.

426. **Leptospermum myrtifolium,** *Sieb.*, (Syn. *L. multicaule*, A. Cunn.); N.O., Myrtaceæ, B.Fl., iii., 108.

Wood close-grained, tough, and dark in colour. Height, 8 to 10ft.

All the colonies except South and Western Australia.

427. **Leucopogon lanceolatus,** *R. Brown*, (Syn. *L. australis*, Sieb. non R.Br.; *L. Cunninghamii*, DC.; *L. affinis*, R.Br.; *Styphelia lanceolata*, Smith; *S. affinis*, Spreng.); N.O., Epacrideæ, B.Fl., iv., 185. *Styphelia lanceolata* in Muell. Cens., p. 105.

Wood hard, close-grained, and beautifully marked. Diameter, 3 to 6in.; height, 12 to 15ft.

All the colonies except South and Western Australia.

428. **Leucopogon melaleucoides,** *A. Cunn.*, (Syn. *L. linifolius*, A. Cunn.; *Styphelia linifolia*, F.v.M.); N.O., Epacrideæ, B.Fl., iv., 207. *Styphelia linifolia* in Muell. Cens., p. 106.

A shrub. Wood of a rather dark colour and nicely marked, hard, and close in the grain.

New South Wales and Queensland.

429. **Leucopogon Richei,** *R.Br.*, N.O., Epacrideæ, B.Fl., iv., 186. For botanical synonyms, see p. 38. *Styphelia Richei* in Muell. Cens., p. 105.

The wood of full-grown shrubs is of a deep orange colour, inclining to red, hard, dense, close-grained, exceedingly heavy; used for the knees of boats. The tortuous and rough-barked

branches are well adapted for rustic work. (Guilfoyle.) Height, 4 to 15ft.

All the colonies.

430. **Licuala Muelleri,** *Wendl.*, (Syn. *Livistona Ramsayi*, F.v.M.); N.O., Palmeæ, B.Fl., vii., 145.

The wood, or the outer hard portion of the stem of this palm is hard, and marked with narrow black lines.

Queensland.

431. **Litsæa dealbata,** *Nees*, (Syn. *Tetranthera dealbata*, R.Br.); N.O., Laurineæ, B.Fl., v., 307.

"Pigeon-berry Tree." "Native Mulberry." "Black Ash."

Timber fragrant, close-grained, tough, and sound; used for indoor work. In colour, it is yellowish, with numerous short, brown, longitudinal streaks. Diameter, 24 to 36in.; height, 100 to 150ft.

New South Wales and Queensland.

432. **Litsæa ferruginea,** *R.Br.*, N.O., Laurineæ, p. 426, *Synop. Queensland Flora* (Bailey).

Wood pale yellow, light, close-grained, and easily worked. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

433. **Livistona australis,** *Mart.*, (Syn. *L. inermis*, Wendl.; *Corypha australis*, R.Br.); N.O., Palmeæ, B.Fl., vii., 146.

"Cabbage Tree," or "Cabbage Palm."

Wood, or outer part of the stem, moderately hard and of a light colour. It is occasionally used for walking-sticks, slabs for buildings, or the trunks are hollowed out for pig troughs. Diameter, 12 to 18in.; height, 100 to 130ft.

Victoria, New South Wales and Queensland.

434. **Livistona humilis,** *R.Br.*, (Syn. *L. Leichhardtii*, F.v.M.); N.O., Palmeæ, B.Fl., vii., 146.

The wood, or the outer portion of the stem, is hard, and of a light colour; the inner portion is soft and useless. Height, 10 to 15ft.

Northern Australia.

435. **Livistona inermis,** *R.Br.*, N.O., Palmæ, B.Fl., vii., 146.

"Cabbage Palm." "Partridge-wood."

The outer portion of the trunk of this tree is very hard, beautifully marked, and takes a good polish. In colour, it is light-grey, streaked with a darker colour. Diameter, 12 to 15in.; height, 14 to 40ft.

Northern Australia.

436. **Lomatia ilicifolia,** *R.Br.*, (Syn. *L. Frazeri*, R.Br.; *Embothrium ilicifolium*, Poir.); N.O., Proteaceæ, B.Fl., v., 536.

"Native Holly."

A shrub, with a light and very hard wood. It has a beautiful small figure, and works well. Specific gravity of dry wood (one experiment), .678. (Mueller.)

Victoria and New South Wales.

437. **Lomatia longifolia,** *R.Br.*, (Syn. *L. angustifolia*, Schnitzl.; *Embothrium myricoides*, Gærtn.; *E. longifolium*, Poir.; *Tricondylus myricæfolius*, Knight); N.O., Proteaceæ, B.Fl., v., 537.

"Mountain Beech."

A light coloured wood, very hard, with a beautiful small figure; works well for turnery. (*Jurors' Reports, London International Exhibition*, 1862.) Height, 8 to 10ft.

Victoria and New South Wales.

438. **Lonchocarpus Blackii,** *Benth.*, (Syn. *Millettia Blackii*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 271.

"A tall woody climber." Wood very stringy, dark brown, and porous. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

439. **Lucuma sericea,** *Benth. et Hook.*, (Syn. *Sideroxylon sericeum*, Ait.); N.O., Sapotaceæ, B.Fl., iv., 279.

"A tree of stunted growth." Wood light yellow, somewhat resembling Birch; close in the grain, and firm; useful for cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland and Northern Australia.

440. **Lumnitzera coccinea,** *Wight*, (Syn. *L. littorea*, Voigt.); N.O., Combretaceæ, B.Fl., ii., 503.

"A bushy shrub or small tree." The wood is blackish, hard, and durable. It is used in Fiji for various purposes. (Seemann.)

Queensland.

441. **Lumnitzera racemosa,** *Willd.*, (Syn. *Petaloma alternifolia*, Roxb.); N.O., Combretaceæ, B.Fl., ii., 504.

A native name is "Karkin."

"A tree or tall shrub," Wood of a pinkish-grey colour, and prettily marked, hard, and close in the grain. "It has a strong and durable wood, is used for house posts in India, and in Calcutta for fuel, of which it furnishes a large portion of the supply." (Roxburgh.) Diameter, 2 to 6in.; height, 10 to 15ft.

Queensland and Northern Australia.

442. **Lysicarpus ternifolius,** *F.v.M.*, (Syn. *Tristania angustifolia*, Hook.; *Metrosideros ternifolia*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 267. *Metrosideros ternifolia* in Muell. Cens., p. 59.

"Tom Russell's Mahogany."

Timber hard, heavy, elastic, and prettily marked; used for cabinet-work, but more particularly for piles, bridges, railway sleepers, etc. Diameter, 18 to 24in.; height, 40 to 50ft.

Queensland.

443. **Maba fasciculosa,** *F.v.M.*, N.O., Ebenaceæ, B.Fl., iv., 290.

"A tall tree." Wood of a light colour, with black specks or streaks, close-grained, strong, and elastic; suitable for carving or wood stamps. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

444. **Maba geminata,** *R.Br.*, N.O., Ebenaceæ, B.Fl., iv., 291.

The wood is hard and tough, heavy, and elastic. It is black towards the centre, and bright red towards the bark. (Thozet.) It takes a high polish. and is recommended for veneers. The black portion is a fairly good substitute for ebony. Diameter, 9 to 12in.; height, 50 to 60ft.

Queensland and Northern Australia.

445. **Maba humilis,** *R.Br.*, (Syn. *M. obovata*, R.Br.); N.O., Ebenaceæ, B.Fl., iv., 291.

"Ronone" of some Queensland aboriginals. "Thankoin" and "Mogiore" are names by which this tree is known to the aboriginals of the Cloncurry River (North Queensland).

"A bushy shrub or small tree." Wood, with the outer part, white and pink; the centre black, hard, and very tough; a useful cabinet wood. It is used for mallet and chisel handles. Diameter, 5 to 12in.; height, 20 to 30ft.

Queensland and Northern Australia.

446. **Macadamia ternifolia,** *F.v.M.*, (Syn. *Helicia ternifolia*, F.v.M.); N.O., Proteaceæ, B.Fl., v., 406.

"Queensland Nut." "Kindal-kindal" of the aborigines.

A small tree. Wood firm, fine-grained, and takes a good polish. It is of a reddish colour, and used for staves, cabinet-work, veneers, shingles, and bullock yokes.

Northern New South Wales and Queensland.

447. **Macaranga inamœna,** *F.v.M.*, (Syn. *Mallotus inamœnus*, F.v.M.); N.O., Euphorbiaceæ, B.Fl., vi., 145.

A tall shrub or small tree. Wood of a light colour, tough, and close-grained.

Queensland.

448. **Macaranga involucrata,** *Baill.*, (Syn. *M. mallotoides*, F.v.M.; *M. asterolasia*, F.v.M.; *Urtica involucrata*, Roxb.); N.O., Euphorbiaceæ, B.Fl., vi., 149.

Wood very light and soft; might be found serviceable for making splints. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) It is not endemic in Australia. Height, up to 50 or 60ft.

Queensland.

449. **Macaranga Tanarius,** *Muell., Arg.*, (Syn. *Ricinus Tanarius*, Linn.; *Mappa Tanaria*, Spreng.); N.O., Euphorbiaceæ, B.Fl., vi., 146.

"Tumkullum" of some Queensland aborigines.

"A tall, erect shrub." Wood of a light colour, soft, and close-grained.

New South Wales, Queensland and Northern Australia.

450. **Macropteranthes Fitzalani,** *F.v.M.*, N.O., Rhizophoreæ, Muell. Cens., p. 51.

Wood with yellow sap-wood, heart-wood dark grey, very close-grained, and hard; perhaps useful for turnery and cabinet-work.

Queensland.

451. **Mallotus claoxyloides,** *Muell.*, Arg., (Syn. *Echinocroton claoxyloides*, F.v.M.; *Echinus claoxyloides*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 140.

"A tall straggling shrub or small tree." Wood of a bright yellow colour, close-grained; useful for cabinet-work. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Northern New South Wales and Queensland.

452. **Mallotus discolor,** *F.v.M.*, (Syn. *Rottlera discolor*, F.v.M.; *Macaranga mallotoides*, F.v.M. var.); N.O., Euphorbiaceæ, B.Fl., vi., 143.

"Bungaby" of the aboriginals of Northern New South Wales.

Wood of a uniform white colour, softish, and easily worked. It has a somewhat close grain. Diameter, 12 to 18in.; height, 35 to 45ft.

Northern New South Wales and Queensland.

453. **Mallotus phillipensis,** *Muell., Arg.*, (Syn. *Rottlera tinctoria*, Roxb.; *Croton philippensis*, Lam.; *Echinus phillippensis*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 141.

The "Kamala" tree of India. The "Poodgee-poodgera" of some Queensland aboriginals.

Wood hard, close-grained, very tough, and of a light red or grey colour. It warps and shrinks, and is used only for fuel in India. Its weight is 48lb. per cubic foot. (Gamble.) Diameter, 6 to 14in.; height, 30 to 45ft.

New South Wales and Queensland.

454. **Marlea Vitiensis,** *Benth.*, N.O., Cornaceæ, B.Fl., iii., 386, *Rhytidandra vitiense*, in Muell. Cens., p. 74.

"Musk Tree." For botanical synonyms, see p. 41.

Wood bright yellow, with a fine undulating appearance, black at the centre. (Hill.) It is close in the grain, has a musk-like scent; and is an excellent wood for cabinet-work. This plant is not endemic in Australia. Diameter, 6 to 12in.; height, 20 to 30ft.

Northern New South Wales.

455. **Medicosma Cunninghamii,** *Hook. f.*, (Syn. *Acronychia Cunninghamii*, Hook.; *Evodia Cunninghamii*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 362. *Euodia Cunninghamii*, in Muell. Cens., p. 12.

A small tree. Wood of a light yellow colour, close in the grain; a good cabinet-makers' wood.

Northern New South Wales and Queensland.

456. **Melaleuca acacioides,** *F.v.M.*, N.O., Myrtaceæ, B.Fl. iii., 138.

A small tree, wood strong and of a dark colour.

Northern Australia.

457. **Melaleuca angustifolia,** *Gaertn.*, (Syn. *Asteromyrtus Gærtneri*, Schau.); B.Fl., iii., 139.

Wood of a dark colour, hard, and tough. Excellent for posts and piles.

Queensland.

458. **Melaleuca armillaris,** *Smith*, (Syn. *M. ericæfolia*, Andr.; *Metrosideros armillaris*, Gærtn.); N.O., Myrtaceæ, B.Fl., iii., 146.

"Prickly-leaved Tea-tree."

Wood hard, and durable for inside, underground, or water-work; it soon decays when exposed to the atmosphere. (Guilfoyle.) Height, up to 20 or 30ft.

Victoria, New South Wales and Queensland.

459. **Melaleuca decussata,** *R.Br.*, (Syn. *M. parviflora*, Reichb.; *M. oligantha*, F.v.M.; *M. tetragona*, Otto); N.O., Myrtaceæ, B.Fl., iii., 133.

This wood is hard and tough. Height, up to 20ft.

Victoria and South Australia.

460. **Melaleuca ericifolia,** *Smith*, (Syn. *M. nodosa*, Sieb. non Smith; *M. Gunniana*, Schau.; *M. heliophila*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 159.

"Swamp Tea-tree."

A shrub or tree. This wood is extensively used by the settlers for bush fences, sheep hurdles, etc. It is very hard when seasoned, and will last a long time under water, or for inside work, such as rafters for huts. (Guilfoyle.) In Tasmania it is used chiefly for turnery. A ton of dry wood yields about 16½lb. of crude potash, equal to 4⅓lb. of chemically pure potash. (Mueller.)

All the colonies except Western Australia.

461. **Melaleuca genistifolia,** *Smith*, (Syn. *M. lanceolata*, Otto; *M. bracteata*, F.v.M.; *Metrosideros decora*, Salisb.); N.O., Myrtaceæ, B.Fl., iii., 143.

"Ridge Myrtle." Called "Ironwood" in parts of Queensland.

Wood close-grained, hard, and durable. It is of a greyish colour. Diameter, 20 to 24in.; height, 30 to 40ft.

New South Wales, Queensland and Northern Australia.

462. **Melaleuca leucadendron,** *Linn.*, (Syn. *M. minor*, Smith; *M. viridiflora*, Gærtn.; *M. saligna*, Blume.; *Metrosideros*

albida, Sieb.; *M. coriacea*, Salisb.); N.O., Myrtaceæ, B.Fl., iii.; 142. *Melaleuca Leucadendra* in Muell. Cens., p. 55.

"White Tea Tree," "Swamp Tea Tree," "Broad-leaved Tea Tree," "Paper-bark Tree." Called "Milkwood" in the Northern Territory, and "Atchoourgo" by the aboriginals of the Mitchell River (North Queensland).

This wood shows a most beautiful combination of light and darker shades, which may be compared in appearance to ripple marks. It is hard, heavy, and close-grained, excellent for ship-building and posts in damp ground; it is said to be imperishable underground. The papery bark of this tree is also worthy of notice from its great durability, and from its being impervious to water, instances being known where it has been used for dam and drainage purposes, in conjunction with timber, and it has been found that the bark was quite sound, although the timber was decayed. Diameter, 12 to 24in.; height, 40 to 50ft.

Western Australia, New South Wales, Queensland and Northern Australia.

463. **Melaleuca linariifolia**, *Smith*, (Syn. *Metrosideros hyssopifolia*, Cav.); N.O., Myrtaceæ, B.Fl., iii., 140.

This wood is valuable for piles in swampy ground or in water, where it is almost imperishable. It is said to be useful for turnery, and it is said to make first-class fuel. Diameter, 1½ to 2ft.; height, 40 to 50ft.

New South Wales and Queensland.

464. **Melaleuca Preissiana**, *Schauer*, (Syn. *M. parviflora*, Lindl.; *M. curvifolia* Schlecht.; *M. pubescens*, Schauer.); N.O., Myrtaceæ, B.Fl., iii., 145. *M. parviflora* in Muell. Cens., p. 55.

A tall shrub or tree. This wood is heavy, white, close-grained, hard, tough, and durable. Specific gravity, .993. (Mueller.)

All the colonies except Victoria.

465. **Melaleuca squarrosa**, *Smith*, (Syn. *M. myrtifolia*, Vent.); N.O., Myrtaceæ, B.Fl., iii., 139.

This wood is hard, dense, and durable when under water or exposed to atmospheric influences. "Specific gravity, .713." *(Report Victorian Exhibition*, 1861.) Height, up to 10ft.

All the colonies except Western Australia and Queensland.

466. **Melaleuca styphelioides,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 144.

"Prickly-leaved Tea-tree," "Black Tea-tree." Formerly called "Naambaar" by the aboriginals of Illawarra (New South Wales).

Hard, close-grained wood, stands well in damp situations. It is said that it has never been known to decay. (Hill.) It rends very much in seasoning. Being hard to work, it is not a favourite with sawyers. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 73lb. 6oz. and 66lb. 12oz. respectively per cubic foot. Diameter, 9 to 12in.; height, 20 to 30ft.

New South Wales and Queensland.

467. **Melaleuca symphyocarpa,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 138.

Wood dark coloured, close-grained, hard, and prettily marked. *(Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Northern Australia.

468. **Melaleuca uncinata,** *Smith*, (Syn. *M. hamata*, Field and Gard., S.Pl.; *M. Drummondii*, Schau.; *M. semiteres*, Schau.); N.O., Myrtaceæ, B.Fl., iii., 150.

"Common Tea-tree." "Yaang-arra" of the aboriginals of Illawarra (New South Wales).

A very hard, close, durable wood, but liable to split or open when exposed to the air in drying. Diameter, 24 to 36in.; height, 70 to 90ft.

All the colonies except Victoria.

469. **Melia composita,** *Willd.*, (Syn. *M. australasica*, A. Juss.; *M. Azedarach*, Linn.); N.O., Meliaceæ, B.Fl., i., 380.

"Persian Lilac" of India. "White Cedar" of New South Wales and Queensland. Called also "Cape Lilac" in Australia. "Dygal" of the

aboriginals of Northern New South Wales. "Dtheerah" is another aboriginal name.

This timber is soft, and easily worked, but not in very good repute, though undeservedly, as the timber from a well-matured tree is found to be very durable. (Hill.) "Beddome, Brandis, and Kurz all say it warps and splits, but Mr. Halsey, of Madhopur, writes to say it is equally useful green or seasoned. Our specimens split only very slightly, and we are inclined to think it is better than it is supposed to be. It is handsomely marked, and polishes well. Its weight is from 30 to 38lb. per cubic foot." (Gamble, *Manual of Indian Timbers.*)

The rings in New South Wales specimens are very distinct, and their markings give the timber a rich, wavy appearance, which is best exhibited in a vertical section. The wood is a pale yellowish-brown, which appears of a rich warm brown under polish. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 33lb. 5oz. and 35lb. 4oz. per cubic foot respectively. Diameter, 15 to 24in.; height, 40 to 50ft.

New South Wales, Queensland and Northern Australia.

470. **Melicope erythrococca,** *Benth.*, (Syn. *Evodia erythrococca*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 360. *Evodia erythrococca* in Muell. Cens., p. 12.

A rather heavy wood, paler than Boxwood, which it somewhat resembles. It has a pretty grain, and is of a delicate tint. Its weight would be against it for ordinary cabinet-making purposes. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 50lb. 6oz. per cubic foot.

New South Wales and Queensland.

471. **Melicope neurococca,** *Benth.*, (Syn. *Evodia neurococca*, F.v.M.; *Bouchardatia neurococca*, Baill.); N.O., Rutaceæ, B.Fl., i., 360. *Bouchardatia neurococca* in Muell. Cens., p. 12.

A small tree. Wood very hard, close-grained, and of a uniform light yellow colour.

New South Wales and Queensland.

472. **Millettia megasperma,** *F.v.M.*, (Syn. *Wistaria megasperma*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 211. *Wistaria megasperma* in Muell. Cens., p. 39.

This plant is a climber, with a stem which is sometimes a foot in diameter. It is rather a heavy wood, of a warm brown colour, and a grain resembling cedar, but it is apt to split in seasoning, and to clog the plane. When these difficulties have been overcome it is a nice, clean-looking, useful wood. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 55lb. 1oz. per cubic foot.

New South Wales and Queensland.

473. **Mimusops Browniana,** *Benth.*, (Syn. *M. Kauki*, R.Br. non Linn.; *M. Kauki*, var. *Browniana*, A.DC.); N.O., Sapotaceæ, B.Fl., iv., 285.

"A tree of irregular growth." Wood red, fine-grained, and easy to work. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

474. **Mimusops parvifolia,** *Linn.*, N.O., Sapotaceæ, B.Fl., iv., 284.

The wood is close-grained, firm, of a pinkish colour, and easy to work. Diameter, 12 to 20in.; height, 40 to 60ft.

Queensland and Northern Australia.

475. **Mollinedia loxocarya,** *Benth.*, N.O., Monimiaceæ, B.Fl., v., 287.

A shrub. Wood yellowish, close in the grain, and prettily marked.

Queensland.

476. **Monotoca elliptica,** *R.Br.*, (Syn. *M. albens*, R.Br.; *Styphelia elliptica*, Smith); N.O., Epacrideæ, B.Fl., iv., 230. *Styphelia elliptica* in Muell. Cens., p. 107.

"Beech," "Wallang-unda" of some New South Wales aboriginals.

This wood has been experimented upon in England as a substitute for Boxwood in engraving, but though to all appearances it is an excellent wood, yet Mr. Worthington Smith reported upon it as having a bad surface, and readily breaking away, so that the cuts require much retouching after engraving. The wood is excellent for planes and other carpentry tools, works well, and is indeed superior to English Beech for such purposes. (*Jurors' Reports, London International Exhibition of* 1862.) It has a silvery grain, and some planks are of great beauty, especially when polished. They cannot be planed in the direction of the grain, but across it, and finished off with the scraper. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 36lb. 13oz. and 44lb. 10 oz. per cubic foot respectively. The lighter wood is the softer, has an interlocked grain, and is very homogeneous; the heavier one is full of knots. Height, up to 20 or 30ft.

All the colonies except South and Western Australia.

477. **Monotoca scoparia,** *R.Br.*, (Syn. *M. patens*, A. Cunn; *M. propinqua*, A. Cunn.; *Styphelia scoparia*, Smith); N.O., Epacrideæ, B.Fl., iv., 230. *Styphelia scoparia* in Muell. Cens., p. 107.

A small shrub. Wood of a pale yellow colour, close-grained, nicely marked, and easily worked. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

All the colonies except South and Western Australia.

478. **Morinda citrifolia,** *Linn.*, (For botanical synonyms see p. 45), N.O., Rubiaceæ, B.Fl., iii., 402 and 423. Muell. Cens., p. 74 and 75.

"Leichhardt's Tree," "Canary-wood," "Indian Mulberry." "Oolpanje" of the aboriginals of the Mitchell River, and "Coobiaby" of

those on the Cloncurry River, both in Northern Australia. "Toka" of those of Rockhampton. "Taberol" of those of Cleveland Bay.

The wood is of a yellow colour, and has a strong musk-like odour when freshly cut. It is useful both to the carpenter and to the cabinet-maker. It is soft, but close in the grain. Some varieties have a beautiful wavy grain, surpassing satin-wood in appearance. It is easily worked, and takes a good polish. It is used for building purposes, and has the peculiarity of being very difficult to ignite. The trees should be cut in winter, when deprived of their leaves, and submerged, or the timber will be subject to the attacks of insects. (Thozet.) The weight of some Indian-grown timber is given at 30lb. per cubic foot (Skinner), but 41lb. (Gamble). Diameter, 24 to 30in.; height, 50 to 70ft.

Queensland and Northern Australia.

479. **Morinda jasminoides,** *A. Cunn.*, N.O., Rubiaceæ, B.Fl., iii., 424.

Wood yellow, and prettily marked. A shrub. Height, up to 20ft.

Victoria, New South Wales and Queensland.

480. **Murraya exotica,** *Linn.*, (Syn. *M. paniculata*, Jack.); N.O., Rutaceæ, B.Fl., i., 369.

"China Box."

The wood is light yellow, close-grained, very hard, and apt to crack. It resembles Boxwood, and has been tried for wood-engraving, for which it seems suitable, if well seasoned; it is also used for the handles of implements. Its weight varies from 61 to 63lb. per cubic foot. (Gamble, *Manual of Indian Timbers.*) A shrub or small tree.

Queensland.

481. **Myoporum acuminatum,** var., **angustifolium,** *R.Br.*, (Syn. *M. Cunninghamii*, Benth.; *M. montanum*, R.Br.; *M. cyanantherum*, A. Cunn.; *M. Dampieri*, A. Cunn.); N.O.,

Myoporineæ, B.Fl., v., 3. *M. montanum* in Muell. Cens., p. 104.

"Dogwood." "Mee-mee" of some Queensland aboriginals. "Nymoo" is another aboriginal name. It is called "Waterbush" and "Native Daphne" in Western New South Wales.

Timber soft and moderately light, yet tough. It is used for building purposes. It dresses well, and is straight in the grain, but it calls for no particular comment. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. 3oz. per cubic foot. Diameter, 9 to 15in.; height, 30 to 40ft.

All the colonies except Tasmania.

482. **Myoporum platycarpum,** *R.Br.*, (Syn. *Disoon platycarpus*, F.v.M.); N.O., Myoporineæ, B.Fl., v. 7.

"Sugar-tree." "Dogwood." "Sandal-wood," or "Bastard Sandal-wood." "Ngural" *of the aboriginals of Lake Hindmarsh Station (Victoria).*

This wood possesses a very pleasant perfume when freshly worked. It is suitable for veneering and cabinet-work, having a fine grain, and being beautifully mottled and grained; it takes a fine polish. "Specific gravity (one experiment), .840." (Mueller.) Wood cut from a natural excrescence or burr of this tree is of singular beauty. A specimen in the Technological Museum shows groups of birds'-eye knots, and these, with the general grain of the wood, form a very rich combination. The colour is light walnut, and the markings are suggestive (though not in colour) of birds'-eye maple. The dry wood of this tree, split into laths, and tied with bark by the natives, led Mr. Lockhart Morton (*Proc. R.S., Vict.*, 1860, p. 132) to conclude that it possesses good burning qualities. He put the end of a piece into the fire, when it burnt like a candle. A tall shrub or small tree.

All the colonies except Tasmania and Queensland.

483. **Myoporum serratum,** *R.Br.*, (Syn. *M. insulare*, R.Br.; *M. tasmanicum*, A.DC.); N.O., Myoporineæ, B.Fl., v. 4. *M. insulare* in Muell. Cens., p. 104.

"Blueberry Tree," "Native Currant Tree," "Native Juniper," "Native Myrtle," "Cockatoo Bush," are names used chiefly in South Australia. "Palberry" is used by natives of the Coorong (South Australia).

A shrub or small tree. The wood is hard, white, and durable when unexposed to atmospheric influences. It has been used for inlaying. "Specific gravity, .809 for an air-dried specimen, and .819 for a steam-dried one." *(Report, Victorian Exhibition,* 1861.)

All the colonies except Queensland.

484. **Myristica insipida,** *R.Br.*, (Syn. *M. cimicifera*, R.Br.); N.O., Myristiceæ, B.Fl., v. 281.

"Queensland Nutmeg."

Wood of a pinkish-grey colour, tough, and easily worked. A tree of 60 or 70ft.

Queensland and Northern Australia.

485. **Myrsine variabilis,** *R.Br.*, N.O., Myrsineæ, B.Fl., iv., 275.

Another of the trees absurdly called "Jemmy Donnelly."

The wood is yellowish, hard, and tough. It is durable, and in grain is something like the British Oak. "Specific gravity (one experiment), .714." (Osborne.) Diameter, 12 to 15in.; height, 45 to 50ft.

Victoria, New South Wales and Queensland.

486. **Myrtus acmenioides,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 276.

"White Myrtle" of the Richmond and Clarence Rivers (New South Wales). "Lignum-Vitæ."

Wood close-grained, very hard, durable, and tough; used by coach-builders, etc. This wood is rather lighter in colour than that of others of this genus. It is homogeneous, with a good clean surface, but it is not ornamental. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 61lb. per cubic foot. Diameter, 12 to 18in.; height, 60 to 70ft.

Northern New South Wales and Queensland.

487. **Myrtus Beckleri,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 275.

"Ginugal" is an aboriginal name in use on the Richmond River. "Kaarin" is another aboriginal name.

A tall shrub. The timber is of a reddish colour when fresh, becoming paler when dry. It has a black heart, and is said to be durable. It is very much like the wood of *Eugenia myrtifolia*, but it is more difficult to get a good face surface than with that wood. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 44lb. 6oz. per cubic foot.

Northern New South Wales.

488. **Myrtus gonoclada,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 275.

Called "Ironwood" in Northern Queensland.

The Rev. J. E. Tenison-Woods states that this wood is of extraordinary hardness, and surmises that it would be superior to Box for wood-engraving.

Queensland.

489. **Myrtus Hillii,** *Benth.*, N.O., Myrtaceæ, B.Fl., iii., 275.

"Scrub Ironwood."

A shrub or small tree. Wood of a light grey colour, close in the grain, and very hard; it warps in drying. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

490. **Myrtus racemulosa,** *Benth.*, N.O., Myrtaceæ, B.Fl., iii., 276.

A small tree. Wood of a close grain, and tough; it warps in drying.

Queensland.

491. **Nephelium divaricatum,** *F.v.M.*, (Syn. *Arytera divaricata*, F.v.M.); N.O., Sapindaceæ, B.Fl., i., 467.

"Coogera" of the aboriginals.

The timber is hard, has a yellow heart, and white sap-wood. Diameter, 2ft.; height, 70 to 80ft.

Queensland.

492. **Nephelium leiocarpum,** *F.v.M.*, *Spanoghea nephelioides*, N.O., Sapindaceæ, B.Fl., i., 467.

A timber, sometimes ornamental, of which nothing seems to be known at present. A log is in process of seasoning in the Technological Museum. Diameter, 6 to 12in.; height, 20 to 30ft.

Victoria to Queensland.

493. **Nephelium tomentosum,** *F.v.M.*, Sapindaceæ, B.Fl., i., 466.

Wood of a yellow colour, close-grained, and hard. Height, 20 or 30ft., and more.

Northern New South Wales and Queensland.

494. **Nesodaphne obtusifolia,** *Benth.*, (Syn. *Beilschmiedia obtusifolia*, Benth. et Hook., *Cryptocarya obtusifolia*, F.v.M.); N.O. Laurineæ, B.Fl., v., 299, *Beilschmiedia obtusifolia* in Muell. Cens., p. 3.

Called "Sassafras," from its aromatic tonic bark.

"A large and handsome tree." Wood pale coloured, close in the grain, firm, easy to work, and suitable for joiners' work. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Northern New South Wales and Queensland.

495. **Notelæa ligustrina,** *Vent.*, N.O., Jasmineæ, B.Fl., iv., 300.

"Ironwood" and "Heart-wood" of Tasmania. "Spurious Olive." "White Plum" of Gippsland.

An exceedingly hard, close-grained wood, used for mallets, sheaves of blocks, turnery, etc. The heart-wood yields a very peculiar figure; it is a very fair substitute for Lignum-Vitæ. "Specific gravity, .925." (*Report Victorian Exhibition*, 1861.) Diameter, 12 to 14in.; height, 30ft.

Tasmania, Victoria and Southern New South Wales.

496. **Notelæa longifolia,** *Vent.*, (Syn. *N. reticulata*, DC.; *N. ovata*, Endl., *non* R.Br.; *N. venosa*, F.v.M.; *N. rigida*, Sieb.; *Olea apetala*, Andr.); N.O., Jasmineæ, B.Fl., iv., 299.

"Axe-breaker." "Mock Olive." "Coobagum" of the aboriginals of Northern New South Wales.

Wood hard, close-grained, and firm. Its vernacular name emphasises its hardness. Diameter, 12 to 18in.; height, 48 to 50ft.

Gippsland to Southern Queensland.

497. **Notelæa microcarpa,** *R.Br.*, N.O., Jasmineæ, B.Fl., iv., 300.

"A small tree." Wood of light colour, dark towards the centre, close-grained, and very hard.

New South Wales and Queensland.

498. **Notelæa ovata,** *R.Br.*, N.O., Jasmineæ, B.Fl., iv., 299.

"Native Olive." "Dunga-runga" of the aboriginals of New South Wales.

This small tree has a crooked growth, but its wood is close, hard, and firm. (Macarthur.) It is used for tool handles, but requires to be seasoned carefully. It dresses well both on the face and end-grain, and, while of a rather light colour as a whole, it is often coloured in patches or blotches of a dark-brown colour, which increase its beauty under polish. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 60lb. 5oz. per cubic foot.

New South Wales and Southern Queensland.

499. **Olea paniculata,** *R.Br.*, N.O., Jasmineæ, B.Fl., iv., 297.

"Native Olive," "Ironwood," "Marble-wood." "Marvey" of the aboriginals of Northern New South Wales. "Billan-billan" of the aboriginals of the Bunya Mountains (Queensland).

The heart-wood is nicely mottled. It is of a whitish colour, darkening towards the centre, and prettily figured. It is hard and tough, close-grained, and durable. It is used for staves, and is suitable for turning, and possibly for wood-engraving. When newly cut it has a rose-like fragrance. Diameter, 18 to 24in.; height, 50 to 70ft.

New South Wales and Queensland.

500. **Olearia argophylla,** *F.v.M.*, (Syn. *Eurybia argophylla*, Cass.; *Aster argophyllus*, Labill.); N.O., Compositæ, B.Fl., iii., 470. *Aster argophyllus* in Muell. Cens., p. 78.

"Musk-wood." "Daal" of the aboriginals of the Coranderrk Station (Victoria).

This timber has a pleasant fragrance and a beautiful mottled colour, well adapted for turnery, cabinet-work, and perfumery purposes. It works well, and may be had in any quantity, and in slabs of 18 to 36in. diameter. (*Jurors' Reports, London International Exhibition of* 1862.) The wood of the gnarled butt and roots of the tree are beautifully mottled, and consequently much prized. Its specific gravity is about .642, the weight of a cubic foot being about 40lb. Height, 20 to 30ft.

Tasmania, Victoria and New South Wales.

501. **Orites excelsa,** *R.Br.*, N.O., Proteaceæ, B.Fl., v., 411.

"Red Ash." "Silky Oak."

Timber hard, durable, nicely marked, and capable of a good polish. It is used for shingles, farm implements, and various purposes. Diameter, 24 to 36in.; height, 70 to 80ft.

New South Wales and Queensland.

502. **Owenia acidula,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 385.

"Sour Plum," "Native Peach," "Emu Apple," "Mooley Apple," "Rancooran," "Warrongan," and "Gruie-colaine" are aboriginal names.

The wood is close-grained, handsome, and suitable for furniture making. It is reddish, and although hard, it is easy to work. Diameter, 12 to 18in.; height, 30 to 40ft.

South Australia, New South Wales and Queensland.

503. **Owenia venosa,** *F.v.M.*, N.O., Meliaceæ, B.Fl., i., 386.

"Sour Plum." "Tulip-wood." "Mouliibie" of the aboriginals of the Clarence River (New South Wales); "Pyddharr" of those of Queensland.

Wood durable, and easily worked. It is of great strength. It is highly coloured, with different shades, from yellow to black. It takes a good polish, and is used for cabinet-work. Its excessive weight and hardness are against its common use, and it is inclined to tear with the plane, but its bold, handsome figure must always give it a high value as an ornamental timber. It has been suggested for use by the wheelwright. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of

1862), has a weight which corresponds to 62lb. 1oz. per cubic foot. Diameter, 9 to 36in.; height, 30 to 40ft.

Queensland.

504. **Panax elegans,** *F.v.M.*, (Syn. *Nothopanax elegans*, Seem.); N.O., Araliaceæ, B.Fl., iii., 383.

"Laurel," "Light Sycamore," "White Sycamore." "Mowbulan Whitewood" (Queensland). "Tchoonberee" of the aboriginals of Northern New South Wales. "Greyangee" of those of the Bunya Mountains (Queensland). At one time called "Merring-arra" by the aboriginals of Illawarra (New South Wales).

Wood light, soft, and of very little durability. (Hill.) It splits well, might suit for cricket bats, and would form excellent lining boards; it will possibly prove a most useful wood to the musical instrument makers. *(Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) It cleans well, and if cut for effect it will show a neat and pretty grain, but it is apt to get dirty looking with age. It warps and cracks unless very carefully treated. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 30lb. 14oz. and 31lb. 8oz. per cubic foot respectively. Diameter, 12 to 16in.; height, 30 to 40ft.

New South Wales and Queensland.

505. **Panax Murrayi,** *F.v.M.*, (Syn. *Nothopanax Murrayi*, Seem.); N.O., Araliaceæ, B.Fl., iii., 381.

Called "Pencil-wood" in Southern New South Wales.

"A splendid tree, the trunk simple to the height of 50 or 60ft." The lightest wood in Victoria, cuts well, is soft inside, becomes very dense outside as the wood dries, whence the sap-wood is often harder than the heart-wood. It has a large pith. Of some Queensland specimens it was said: "Wood of a light colour, soft, and light; would make good lining boards." Specific gravity, .348, according to one experiment. (Mueller.)

New South Wales and Queensland.

506. **Panax sambucifolius,** *Sieber,* (Syn. *P. angustifolius,* F.v.M.; *P. dendroides,* F.v.M.; *Nothopanax sambucifolius,* Seem.); N.O., Araliaceæ, B.Fl., iii., 382.

"Elderberry Ash" (Victoria).

A tall shrub or tree. This wood is prettily streaked, sound, and very tough; it is extensively used for axe handles, etc., by splitters in the bush. (Guilfoyle.)

All the colonies except Southern and Western Australia.

507. **Pandanus pedunculatus,** *R.Br.,* N.O., Pandaneæ, B.Fl., vii., 149.

"Screw Pine." "Bread-fruit." "Wynnum" of the aboriginals of Queensland.

Wood, or the firm outer part of the stem, of a light colour, and prettily marked. Height, 20 or 30ft.

New South Wales and Queensland.

508. **Parinarium Nonda,** *F.v.M.,* N.O., Rosaceæ, B.Fl., ii., 426.

The "Nonda Tree" of North-eastern Australia. Referred to by Leichhardt at p. 315 of his *Overland Journey to Port Essington.*

Timber soft, close-grained, and easily worked. It is of a light yellow colour, and very strong. Diameter, 18 to 24in.; height, 50 to 60ft.

Queensland and Northern Australia.

509. **Peltophorum ferrugineum,** *Benth.,* (Syn. *Cæsalpinia ferruginea,* DC.; *C. arborea,* Zoll.); N.O., Leguminosæ, B.Fl., ii., 279.

The timber is much in request for cabinet-work. (Hill.) It is blackish, the sap-wood whitish, coarse, fibrous, light. (Kurz., *Forest Flora of British Burmah.*) Diameter, 24 to 30in.; height, 40 to 80ft.

Northern Australia.

510. **Pennantia Cunninghamii,** *Miers.,* N.O., Olacineæ, B.Fl., i., 395.

A timber of the Beech class, which seems always to be found most irregular in section. A log is in process of seasoning in the Technological Museum. Height, 50 to 80ft.; diameter, 1in. to 2ft.

New South Wales and Queensland.

511. **Pentaceras australis,** *Hook.*, (Syn. *Hookia australis*, F.v.M.; *Ailanthus punctata*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 365.

"Scrub White Cedar." "Wobbul-wobbul" of the aboriginals of Northern New South Wales.

The timber is close-grained, tough, and firm. Diameter, 12 to 24in.; height, 40 to 60ft.

Northern New South Wales and Queensland.

512. **Persoonia falcata,** *R.Br.*, (Syn. *P. mimusoides*, A. Cunn.); N.O., Proteaceæ, B.Fl., v., 385.

A "Geebung" (the name given to the fruits of *Persoonias*, and hence to the trees themselves). "Nanchee" and "Booral" of the aboriginals of the Mitchell River (North Queensland).

A small tree. Wood light, with a reddish centre, hard, and close-grained.

Queensland and Northern Australia.

513. **Persoona lanceolata,** *Andr.*, (*P. ligustrina*, Knight; *P. glaucescens*, Sieb.); N.O., Proteaceæ, B.Fl., v., 395.

Called "Bonewood," on account of its hardness and light colour.

A fine timber, much sought after for tool handles.

New South Wales.

514. **Persoonia linearis,** *Andr.*, (*P. angustifolia*, Knight; *P. pinifolia*, Sieb.; *P. filifolia*, Dietr.; *P. pruinosa*, A. Cunn.; *P. pentadactylon*, Steud.; *Pentadactylon augustifolium*, Gærtn.); N.O., Proteaceæ, B.Fl., v., 397.

A "Geebung." Formerly called "Naam-burra" by the aboriginals of Cumberland and Camden (New South Wales).

A tall shrub or small tree. This is not such a handsome timber as many others of the same natural order, and it is apt to lack homogeneity, being traversed by large patches of dark coloured, decayed wood, which is, however, so durable in ordinary

circumstances that it does not fall away from the sound timber and leave holes, but, of course, it is utterly incapable of standing wear. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 50lb. 10 oz. per cubic foot.

Victoria, New South Wales and Queensland.

515. **Persoonia media,** *R.Br.*, N.O., Proteaceæ, B.Fl., v., 391.

"Koombarra" is an aboriginal name.

"A tall, erect shrub." Wood of a light colour, close in the grain, and firm; it might prove useful for tool handles. It somewhat resembles the English Beech, and may prove as serviceable to musical instrument makers. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

516. **Petalostigma quadriloculare,** *F.v.M.*, (Syn. *P. triloculare*, Muell. Arg.; *P. australianum*, Baill.; *Hylococcus sericeus*, R.Br.); N.O., Euphorbiaceæ, B.Fl., vi., 92.

"Crab Tree," "Native Quince," "Emu Apple," "Bitter Bark," "Quinine Tree." "Muntenpen" of the Queensland aboriginals.

The wood is hard, fine-grained, and promises to be useful to the cabinet-maker. (Hill.) It is of a brownish colour, shrinks much in drying, and resembles the English laburnum. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) The large wavy appearance of the grain has a nice effect when polished. It dresses well, especially on the face. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 48lb. per cubic foot. Diameter, 12 to 18in.; height, 40 to 50ft.

Northern New South Wales, Queensland and Northern Australia.

517. **Phebalium Billardieri,** *A. Juss.*, (Syn. *P. retusum*, Hook.; *P. elatum*, A. Cunn.; *P. elæagnoides*, Sieb.; *Eriostemon*

squameus, Labill.); N.O., Rutaceæ, B.Fl., i., 344. *E. squameus* in Muell. Cens., p. 11.

"Bobie-bobie" was an aboriginal name in use south of Sydney.

"An erect shrub, or small tree." The general appearance of this wood is very much like Red Cedar, but it is rather heavier than that wood, is a little lighter in colour, and has a larger figure. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 42lb. per cubic foot.

Tasmania, Victoria, New South Wales and Queensland.

518. **Phyllanthus Ferdinandi,** *Muell. Arg.*, N.O., Euphorbiaceæ, B.Fl., vi., 96.

"White Beech." Called "Pencil Cedar" in Southern New South Wales. "Lignum-Vitæ." "Chow-way" of the aboriginals of Northern New South Wales. "Tow-war" of the Queensland aboriginals.

Timber used for staves and buildings; it is easy to work, close in the grain, of a grey colour, and warps a good deal in drying. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Diameter, 12 to 18in.; height, 70 to 80ft.

New South Wales, Queensland and Northern Australia.

519. **Phyllocladus rhomboidalis,** *Rich.*, (Syn. *P. asplenifolia*, Hook. f.; *Podocarpus asplenifolia*, Labill.; *Thalamia asplenifolia*, Spreng.); N.O., Coniferæ, B.Fl., vi., 246. *Thalamia asplenifolia* in Muell. Cens., p. 109.

"Celery-topped Pine" (from the appearance of the upper part of the branchlets).

The timber is valuable for ships' masts and spars. "A slender tree, attaining 60ft., but reduced to a shrub on the summits of mountains."

Tasmania.

520. **Pimelea microcephala,** *R.Br.*, (Syn. *P. distinctissima*, F.v.M.; *Calyptrostegia microcephala*, Endl.); N.O., Thymeleæ, B.Fl., vi., 27.

Specific gravity of the wood, .883. (*Report, Victorian Exhibition*, 1861.)

All the colonies except Tasmania.

521. **Piper Novæ-Hollandiæ,** *Miq.*, N.O., Piperaceæ, B.Fl., vi., 204.

"Native Pepper Vine." "Climbing Pepper."

"A tall dichotomous plant, climbing against trees in dense forests." Wood coarse-grained, and pungently scented when newly cut. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

522. **Pipturus argenteus,** *Wedd.*, (Syn. *P. propinquus*, Wedd.; *Urtica argentea*, Forst.); N.O., Urticeæ, B.Fl., vi., 185. *P. propinquus* in Muell. Cens., p. 22.

"Coomeroo-coomeroo" of the Queensland aboriginals.

"A tree usually small, but sometimes attaining 50ft." Wood brown, close-grained, and soft.

New South Wales and Queensland.

523. **Pisonia Brunoniana,** *Endl.*, (Syn. *P. Sinclairii*, Hook. f.; *P. Mooriana*, F.v.M.); N.O., Nyctagineæ, B.Fl., v., 280.

"A tree attaining sometimes a great height." Wood soft and light, of a light colour.

New South Wales and Queensland.

524. **Pithecolobium pruinosum,** *Benth.*, (Syn. *Albizzia pruinosa*, F.v.M.; *Acacia sapindoides*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 423. *Albizzia pruinosa* in Muell. Cens., p. 47.

"Talingora" of some Queensland aboriginals.

Wood of a light yellow colour, becoming brown near the centre; of a very disagreeable odour when newly cut. Wood soft, not durable. Diameter, 4 to 15in.; height, 30 to 50ft.

New South Wales and Queensland.

525. **Pithecolobium (?) grandiflorum,** *Benth.*, (Syn. *P. Tozeri* F.v.M.; *Albizzia Tozeri*, F.v.M.; *Mimosa grandiflora*, Soland, M.S.); N.O., Leguminosæ, B.Fl., ii., 424. *Albizzia Tozeri* in Muell. Cens., p. 47.

Wood light yellow, red, and nicely marked towards the centre, close in the grain, light, and easy to work; possessing a most disagreeable scent when newly cut. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) Height, up to 30ft.

New South Wales and Queensland.

526. **Pittosporum bicolor,** *Hook.*, (Syn. *P. discolor*, Regel.; *P. Huegelianum*, Putterl.); N.O., Pittosporeæ, B.Fl., i., 113.

"Whitewood" (Tasmania). "Cheesewood" (Victoria).

This wood is yellowish-white, very hard, and of uniform texture and colour. It was once used for clubs by the aboriginals of Tasmania. It turns well, and should be tested for wood-engraving. (*Jurors' Reports, London International Exhibition of* 1862.) It is much esteemed for axe handles, billiard cues, etc. Specific gravity, .874. (Mueller.) Diameter, 6 to 12in.; height, 20 to 40ft.

Tasmania, Victoria and New South Wales.

527. **Pittosporum phillyræoides,** *DC.*, (for botanical synonyms see p. 136); N.O., Pittosporeæ, B.Fl., i., 113.

"Butter Bush" of Northern Australia. "Willow Tree" of York Peninsula. "Native Willow," "Poison-berry Tree" (South Australia). The berries are not poisonous—only bitter.

Wood close-grained, light in colour, and very hard. Useful for turnery, and possibly for wood-engraving. "Specific gravity, .767." (*Report, Victorian Exhibition,* 1861.) Diameter, 4 to 6in.; height, 20 to 25ft.

All the colonies except Tasmania.

528. **Pittosporum rhombifolium,** *A. Cunn.*, N.O., Pittosporeæ, B.Fl., i., 110.

"Diamond-leaf Laurel" of Northern New South Wales. "Burrawingee" of the aboriginals.

Wood close-grained and white, useful for turnery, and possibly as a substitute for Box-wood in wood-engraving. When fresh cut it emits a very agreeable delicate odour, not unlike mignonette. (Thozet.) Diameter, 6 to 12in.; height, 40 to 55ft.

Northern New South Wales and Queensland.

529. **Pittosporum undulatum,** *Vent.*, N.O., Pittosporeæ, B.Fl., i., 111.

"Native Laurel." "Mock Orange." "Cheesewood" is a common name. "Wallundun-deyren" of New South Wales aboriginals.

A small tree, with very close-grained, hard, white, or whity-brown wood, which, when seasoned carefully, is excellent for turning, and promises to be good for wood-engraving; sound transverse sections of more than 10 to 16in. would be rare. (Macarthur.) While this is one of the most homogeneous woods we have, it has a fine grain (comparable in appearance to a mosaic of grains of sand), which would cause it, I fancy, to tear slightly under the graving tool. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 61lb. 4oz. per cubic foot. It has been introduced into the Azores, where it protects the orange trees from wind, as it withstands the highest gales. Diameter, 1ft.; height, 30 to 50ft.

All the colonies except South and Western Australia.

530. **Podocarpus elata,** *R.Br.*, (Syn. *P. ensifolia*, R.Br.; *P. falcata*, A. Cunn.; *Nageia elata*, F.v.M.); N.O., Coniferæ, B.Fl., vi., 247. *Nageia elata* in Muell. Cens., p. 109.

"Pine." "White Pine." Called "She Pine" in Queensland. "Native Deal." "Pencil Cedar." "Goongum" of the aboriginals of Northern New South Wales, and "Kidney-wallum" of those of Queensland. "Dyrren-dyrren" of the aboriginals of Illawarra.

This tree has an elongated trunk, rarely cylindrical; wood free from knots, soft, close, easily worked, good for joiners' and cabinet-work; some trees afford planks of great beauty. (Macarthur.) Fine specimens of this timber have a peculiar mottled appearance not easily described, and often of surpassing beauty. The wood is tough, the fibre being much interlocked, and rather liable to very fine shakes. It is silky and fine in the grain, lasting, and not readily attacked by white ants or *Teredo*.

Through inadvertence, this timber is erroneously described in the *N.S.W. Catalogue* of the 1862 Exhibition as belonging to *P. spinulosus*. It may be mentioned that *P. spinulosus* is never more

than a small shrub. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 45lb. 11oz. per cubic foot. Diameter, 24 to 36in.; height, 50 to 100ft.

New South Wales and Queensland.

531. **Podopetalum Ormondi,** *F.v.M.*, N.O., Leguminosæ, Muell. Cens., p. 42.

Wood of a pinkish-grey colour, strong, firm, and easy to work.

Queensland.

532. **Polyalthia nitidissima,** *Benth.*, (Syn. *Unona nitidissima*, Dun.; *U. fulgens*, Labill.; *U. nitens*, F.v.M.); N.O., Anonaceæ, B.Fl., i., 51.

"Pankalville" of some Queensland aboriginals.

Wood white, soft, and pliable. (Thozet.) Diameter, 4 to 10in.; height, 30 to 60ft.

New South Wales and Queensland.

533. **Polyosma Cunninghamii,** *J. J. Benn.*, N.O., Saxifrageæ, B.Fl., ii., 438.

"Wineberry," and "Feather-wood" in Southern New South Wales. "Hickory" in the northern part of the colony. "Yerallá," or "Yaralla," about Mount Illawarra.

The wood is close-grained, soft, and very apt to rend in drying. (Macarthur.) It is yellow, tough, and very hard, and is used for levers, ladders, hand spikes, etc. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 49lb. 5oz. per cubic foot. Diameter, 1 to 3ft.; height, 40 to 60ft.

New South Wales and Queensland.

534. **Pomaderris apetala,** *Labill.*, (Syn. *P. aspera*, Sieb.); N.O., Rhamneæ, B.Fl., i., 419.

Called "Hazel" in Victoria. "Kalertiwan" of the aboriginals of Coranderrk Station (Victoria).

"A tall shrub, or small tree." This wood is excellent, of a beautiful satiny texture, and adapted for carvers' and turners' work. Dr. Bennett suggests that it may be useful for wood-engraving. "Specific gravity, .772." (Mueller.)

All the colonies except Western Australia and Queensland.

535. **Pongamia glabra,** *Vent.*, (Syn. *Galedupa indica*, Lam.); N.O., Leguminosæ, B.Fl., ii., 273.

"Indian Beech."

Wood yellow, close-grained, tough, and prettily marked; might be useful for chair-making, as it bears bending. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) It is moderately hard, white, and turns yellow on exposure. It is not durable, and is readily eaten by insects, but is improved by seasoning in water. In Lower Bengal it is used for oilmills and firewood; in South India for solid cart wheels. Weight, 40 to 42lb. per cubic foot. (Gamble.)

Queensland and Northern Australia.

536. **Premna obtusifolia,** *R.Br.*, N.O., Verbenaceæ, B.Fl., v., 58.

"A shrub of 3 to 6ft., with brownish wood."

Queensland and Northern Australia.

537. **Prostanthera lasianthos,** *Labill.*, N.O., Labiateæ, B.Fl., v., 93.

"Mint Tree." Called "Dogwood" in Victoria.

A tall shrub, sometimes attaining the dimensions of a moderate-sized tree. The wood is hard and tough, and of a specific gravity of .809. The saplings are used for fishing rods.

All the colonies except Western Australia.

538. **Pseudomorus Brunoniana,** *Bureau*, (Syn. *Morus Brunoniana*, Endl.; *P. pendulina*, F. Bauer.; *Streblus Brunoniana*, F.v.M.; *S. pendulina*, F.v.M.); N.O., Urticeæ, B.Fl., vi., 181.

Called "Whalebone Tree" in Southern New South Wales. "Mail" of the aboriginals of the Richmond and Clarence Rivers. "Lagaulbie" is another aboriginal name.

Wood light brown, close-grained, hard, and tough. Used by the aboriginals for boomerangs. (Mueller.) It dresses well, and when

cut at right angles to the medullary rays it has a figure remarkably like Oak. When dressed in the ordinary way it has a bold, straight grain, which looks pretty under polish. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 56lb. 1oz. per cubic foot. Diameter, 6 to 15in.; height, up to 30 or 40ft.

New South Wales and Queensland.

539. **Ptychosperma Alexandræ,** *F.v.M.*, (Syn. *Archontophœnix Alexandræ*, Wendl.); N.O., Palmæ, B.Fl., vii., 140.

"Alexandra Palm."

This wood is beautifully marked, and is much in favour for walking-sticks, the outer portion being cut into suitable thicknesses for this purpose. Height, 70 or 80ft.

Queensland.

540. **Ptychosperma elegans,** *Blume*, (Syn. *Seaforthia elegans*, R.Br.); N.O., Palmeæ, B.Fl., vii., 141.

"Bangalow."

The stems are used for the rails of fences. The small stems used sometimes to go under the name of "Moreton Bay Canes." It is a very ornamental, feathery-leaved palm. Diameter, 6 to 12in.; height, 60 to 80ft.

Queensland.

541. **Ptychosperma Laccospadix,** *Benth.*, (Syn. *Laccospadix australasicus*, Wendl.; *Calyptrocalyx australasicus*, Scheff.); N.O., Palmeæ, B.Fl., vii., 140.

"Black Palm."

The outer portion of the wood is used for making walking-sticks. Diameter, 6 to 8in.; height, 12 to 16ft.

Queensland.

542. **Quintinia Sieberi,** *A.DC.*, N.O., Saxifrageæ, B.Fl., ii., 438.

"Opossum Tree."

The timber is heavy, and close-grained; of a yellowish shade, and it seems to be of good quality. (*General Report, Sydney*

International Exhibition, 1879.) Diameter, 24 to 30in.; height, 60 to 70ft.

New South Wales and Queensland.

543. **Randia densiflora,** *Benth.*, (Syn. *Cupia densiflora*, DC.; *Ixora Thozetiana*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 412.

Wood of a light colour, very close in the grain, hard, and tough; might prove suitable for wood stamps. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.) Not endemic in Australia. Diameter, 8 to 12in.; height, 20 to 30ft.

New South Wales, Queensland and Northern Australia.

544. **Randia Fitzalani,** *F.v.M.*, (Syn. *Gardenia Fitzalani*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 411.

The wood of this tree is straw coloured, close in the grain, hard, and tough.

Queensland.

545. **Ratonia anodonta,** *Benth.*, (Syn. *Cupania anodonta*, F.v.M.; *Schmidelia anodonta*, F.v.M.); N.O., Sapindaceæ, B.Fl., i., 461. *Cupania anodonta* in Muell. Cens., p. 24.

"Cumgun" of the aboriginals of Northern New South Wales.

A valuable wood, of moderate weight, and of a pinkish colour. A slab in the Museum appears to have absolutely unaltered during the last quarter of a century, but it has been judiciously cut. It dresses excellently, but has no remarkable figure. A second slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 49lb. 3oz. per cubic foot. Diameter, 20 to 36in.; height, 80ft.

Queensland.

546. **Ratonia pyriformis,** *Benth.*, (Syn. *Schmidelia pyriformis*, F.v.M.; *Cupania pyriformis*, F.v.M.); N.O., Sapindaceæ, B.Fl., i., 461. *Cupania pyriformis* in Muell. Cens., p. 461.

"Brush Apple."

Wood flesh coloured, firm, and tough. It has been suggested as suitable for axe handles. The sample in the Museum has split

somewhat, but no slab of timber could have been more ill cut. It dresses excellently, both on the face and end-grain. It is perhaps a little liable to splinter under the saw. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 53lb. 10z. per cubic foot. Diameter, 10 to 15in.; height, 30 to 40ft.

New South Wales and Queensland.

547. **Ratonia tenax,** *Benth.*, (Syn. *Cupania tenax*, A. Cunn.); N.O., Sapindaceæ, B.Fl., i., 461. *Cupania tenax* in Muell. Cens., p. 24.

"A moderate-sized tree." Wood light in colour, dark towards the centre, very tough, and close-grained.

New South Wales and Queensland.

548. **Rhizophora mucronata,** *Lam.*, (Syn. *R. Mangle*, Roxb.; *R. Candelaria*, Wight et Arn.); N.O., Rhizophoreæ, B.Fl., ii., 493.

"Mangrove."

Wood of a light colour, with a reddish centre, or heart-wood; grain close, tough. Its weight is 70.5lb. per cubic foot. (Gamble.) The aerial roots, being very elastic, afford good materials for bows, of which the Fijians avail themselves. (Seemann.) Height, 15 to 25ft.

New South Wales, Queensland and Northern Australia.

549. **Rhodamnia argentea,** *Benth.*, (Syn. *(?) Myrtus argentea*, Hill); N.O., Myrtaceæ, B.Fl., iii., 278.

"White Myrtle." "Muggle-muggle" of the aboriginals of Northern New South Wales.

Timber hard, close-grained, and durable, but seldom used. Diameter, 24 to 36in.; height, 80 to 100ft.

New South Wales and Queensland.

550. **Rhodamnia sessiliflora,** *Benth.*, N.O., Myrtaceæ, B.Fl., iii., 277.

Wood of a dark colour, close-grained, and tough.

Queensland.

551. **Rhodamnia trinervia,** *Blume*, (Syn. *Myrtus trinervia*, Smith; *M. melastomoides*, F.v.M.; *Monoxora rubescens*, Benth.); N.O., Myrtaceæ, B.Fl., iii., 278.

Called "Black-eye" in the Illawarra district (New South Wales). "Brush Turpentine." "Bummung" of the aboriginals of Northern New South Wales.

This wood is of a reddish-brown colour, and moderately hard, close-grained, and firm, but the tree is always hollow when large. It is a good, useful, plain timber for ordinary purposes, but it is inclined to chip while being dressed. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 50lb. and 52lb. 11oz. per cubic foot respectively. Diameter, 20 up to 30in.; height, 70 to 80ft.

New South Wales and Queensland.

552. **Rhodomyrtus macrocarpa,** *Benth.*, N.O., Myrtaceæ, B.Fl., 273.

"Native Loquat."

The wood of this tall shrub is of a light grey colour, hard, and tough.

Queensland.

553. **Rhodomyrtus psidioides,** *Benth.*, (Syn. *Nelitris psidiodes*, G. Don; *Myrtus Tozerii*, F.v.M.); N.O., Myrtaceæ, B.Fl., 272.

A tree "attaining sometimes a great size." Wood light coloured, close-grained, and tough.

New South Wales and Queensland.

554. **Rhus rhodanthema,** *F.v.M.*, (Syn. *R. elegans*, Hill); N.O., Anacardiaceæ, B.Fl., iii., 489.

"Dark Yellow-wood." Called also "Light Yellow-wood," "Yellow Cedar." "Jango-jango" of the Queensland aboriginals.

The wood is soft, fine-grained, and beautifully marked; it is much esteemed for cabinet-work, as it is one of the handsomest of timbers. It is sound and durable, and will take an excellent polish. It has a brownish or yellowish-bronze colour, with a

silky lustre. When fresh, the colour is lighter than when the wood is older, but it is always inclined to a rich brown, and, therefore, the name "Light Yellow-wood" is very inappropriate, and should only be used for *Flindersia Oxleyana.* A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 47lb. 1oz. per cubic foot. Diameter, 18 to 24in.; height, 60 to 70ft.

Northern New South Wales and Queensland.

555. **Ricinocarpus pinifolius,** *Desf.*, (Syn. *R. sidæformis*, F.v.M.; *Ræperia pinifolia*, Spreng.; *Echinosphæra rosmarinoides*, Sieb.); N.O., Euphorbiaceæ, B.Fl., vi., 70.

A mere shrub usually, but grows larger under very favourable circumstances. Wood light coloured, soft, close in the grain, and works easily.

Tasmania, South Australia, Victoria, New South Wales and Queensland.

556. **Rulingia pannosa,** *R.Br.*, (Syn. *Commersonia dasyphylla*, Andr.; *Buettneria dasyphylla*, J. Gay; *B. pannosa*, DC.); N.O., Sterculiaceæ, B.Fl., i., 238. *Commersonia dasyphylla* in Muell. Cens., p. 16.

"Black Kurrajong." "Kerrawah" is an aboriginal name.

The quality of this timber is above the average of Sterculiaceous woods. It is of comparatively close grain and fair hardness, but it is excessively difficult to season, is liable to the attacks of a coleopterous insect, and is of no beauty. It dresses up fairly well, but, of course, it is rather porous. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 31lb. 2oz. per cubic foot. Height, up to about 30ft.

Victoria, New South Wales and Queensland.

557. **Sambucus xanthocarpus,** *F.v.M.*, (Syn. *Tripetelus australasicus*, Lindl.); N.O., Caprifoliaceæ, B.Fl., iii., 398.

"Native Elderberry."

A tall shrub or small tree. Wood soft, light, and pale coloured.

Victoria, New South Wales and Queensland.

558. **Santalum lanceolatum,** *R.Br.*, (Syn. *S. oblongatum*, R.Br.); N.O., Santalaceæ, B.Fl., vi., 214.

"Sandal-wood." "Tharra-gibberah" of the aboriginals of the Cloncurry River (Northern Queensland).

The wood is close-grained, and takes a good polish. It is firm, yellowish in colour, and useful for cabinet-work. Diameter, 3 to 6in.; height, 15 to 25ft.

All the colonies except Tasmania and Victoria.

559. **Santalum obtusifolium,** *R.Br.*, (Syn. *Santalum ovatum*, R.Br.); N.O., Santalaceæ, B.Fl., vi., 214-5.

"Sandal-wood."

These species, with the preceding one, produce Australian sandal-wood in part. This kind of sandal-wood is, however, yielded for the most part by a species of *Fusanus* (q.v.), which Baron Mueller considers to be a *Santalum*.

Victoria, New South Wales and Northern Australia.

560. **Schizomeria ovata,** *D. Don*, N.O., Saxifrageæ, B.Fl., ii., 443.

This wood bears the various names of "Cork-wood," "Light-wood," "Coach-wood," "Beech," and "White Cherry."

This wood has a reddish or brownish tint, and is used for various purposes, *e.g.*, coach-building, although it has nothing to particularly recommend it. It is very light as regards weight. Diameter, 1 to 2ft.; height, 50 to 60ft.

New South Wales and Queensland.

561. **Semecarpus Anacardium,** *Linn.*, (Syn. *S. australasicus*, Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-nut Tree" of India.

Wood yellow, with brown markings, easy to work, but soft and useless. Woodcutters object to fell it, unless it has been ringed for some time, as it contains an acrid juice, which causes swelling

and irritation. Weight, about 37lb. per cubic foot. (Gamble.) Height, about 30ft.

Queensland and Northern Australia.

562. **Sersalisia sericea,** *R.Br.*, (Syn *Sideroxylon sericeum*, Ait.; *Lucuma sericea*, Benth. and Hook. f.; *Amorphospermum antilogum*, F.v.M.); N.O., Sapotaceæ, B.Fl., iv., 279. *Lucuma sericea* in Muell. Cens., p. 91.

Called "Berryarrah" and "Roomal" by Queensland aboriginals.

Wood hard, close-grained, tough, and firm. Diameter, 12 to 20in.; height, 60 to 70ft.

Queensland and Northern Australia.

563. **Sesbania ægyptica,** *Pers.*, (Syn. *Æschynomene Sesban*, Linn.); N.O., Leguminosæ, B.Fl., ii., 212.

"Ngeen-jerry" of the aboriginals of the Cloncurry River (North Queensland).

This shrub or small tree is used in India as a substitute for the bamboo. Its wood makes excellent gunpowder charcoal. *(Cyclop. of India.)* It is not durable, and its weight is 27lb. per cubic foot. (Gamble.) Good for children's toys. (Kurz.)

Northern Australia.

564. **Siphonodon australe,** *Benth.*, N.O., Celastrineæ, B.Fl., i., 403.

"Ivory-wood." "Currayelbum" of the aboriginals of Northern New South Wales. "Umpurr" of those of Queensland.

Wood white,* very close in the grain, firm, and easily worked; an excellent wood for the cabinet-maker, and probably suitable for engraving. *(Cat. Queensland Timbers, Col. and Ind. Exh.,* 1886.) Diameter, 10 to 24in.; height, 40 to 50ft.

New South Wales and Queensland.

565. **Solanum verbascifolium,** *Ait.*, N.O., Solaneæ, B.Fl., iv., 449.

This tree or shrub is perhaps the largest of the genus. Its wood is of a yellow colour, easily worked, of a close grain, and light. It is, however, of very little use.

Northern New South Wales and Queensland.

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* Of a uniform yellowish colour, according to Thozet.

566. **Spondias pleiogyna,** *F.v.M.*, N.O., Anacardiaceæ, Muell. Cens., p. 26.

"Sweet Plum," or "Burdekin Plum."

Wood hard, dark brown, with red markings, resembling American walnut; the grain pretty close, splits quite straight; an excellent wood for the joiner or cabinet-maker, also suitable for turnery. *(Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

567. **Spondias Solandri,** *Bentham*, (Syn. *S. acida*, Soland.); N.O., Anacardiaceæ, B.Fl., i., 492.

A moderate-sized tree, the trunk occasionally acquiring a very great thickness. Timber soft when cut, though it afterwards becomes hard and tough. (Hill.) Diameter, 24 to 36in.; height, 40 to 60ft.

Queensland.

568. **Stenocarpus salignus,** *R.Br.*, (Syn. *S. acacioides*, F.v.M.; *Hakea rubricaulis*, Colla.; *Embothrium rubricaule*, Giord.); N.O., Proteaceæ, B.Fl., v., 539.

"Silky Oak," "Silvery Oak," "Beef-wood." "Melyn" of the aboriginals.

This timber is of a reddish colour, close in the grain, hard, and splits easily. It is valuable for the finer kinds of coopers' work. (Hill.) It is used for making furniture, picture frames, walking-sticks, and veneers. It is worthy of note that this is the only Proteaceous tree common in cedar brushes. (Macarthur.) A slab of this timber is of extreme beauty for the uniformity of the pale red-brown mottled colour, with an undulating figure perfectly uniform, of hard texture, easily worked. Altogether one of the most beautiful woods in the Exhibition, and of the highest merit. *(Jurors' Reports, London International Exhibition of* 1862.) It has been so much appreciated that it is getting scarce. As it ages it sobers down with a tendency to uniformity of colour throughout. Proteaceous timbers are very characteristic in appearance, and this is no exception. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been

exhibited at the London International Exhibition of 1862), has a weight which corresponds to 44lb. 4oz. per cubic foot. Diameter, 18 to 24in.; height, 30 to 50ft.

New South Wales and Queensland.

569. **Stenocarpus sinuatus,** *Endl.*, (Syn. *S. Cunninghamii*, Hook.; *Agnostus sinuatus*, A. Cunn.); N.O., Proteaceæ, B.Fl., v., 539.

"Tulip Tree." "Fire Tree" (on account of the brilliancy of its flowers). "Yiel-yiel," or "Yill-gill" of the aborigines of Northern New South Wales.

The wood is nicely marked, and admits of a good polish. It is close-grained, hard, and durable, is used for staves and veneers, and is suitable for cabinet-work. It is not a plentiful tree. Diameter, 24in.; height, 60 to 70ft.

Northern New South Wales and Queensland.

570. **Sterculia acerifolia,** *A. Cunn.*, (Syn. *Brachychiton acerifolium*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton acerifolium* in Muell. Cens., p. 15.

Called "Flame Tree" on account of its flowers. "Lace Bark Tree."

A large tree. Wood soft, light, and of a light colour. Like other woods of this genus it can be torn away by the finger-nail, so it can have but a very limited use. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 27lb. 4oz. per cubic foot.

New South Wales and Queensland.

571. **Sterculia discolor,** *F.v.M.*, (Syn. *Brachychiton discolor*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 228. *Brachychiton discolor* in Muell. Cens., p. 15.

"Stunga" of the aboriginals of the Richmond and Clarence Rivers.

A tall tree. This timber is white and soft when cut, but becomes hard in drying. It makes good shingles. (*General Report, Sydney International Exhibition*, 1879.)

Northern New South Wales, Queensland and Northern Australia.

572. **Sterculia diversifolia,** *G. Don*, (Syn. *Pœcilodermis populnea*, Schott.; *Brachychiton populneum*, R.Br.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton populneum* in Muell. Cens., p. 15.

"Black Kurrajong." Called "Bottle Tree" in Victoria.

Timber soft, fibrous, and useless. It is a most ornamental tree. There is a family likeness amongst all *Sterculia* timbers, and this is one of the coarsest and most open-grained of the genus. Like other timbers belonging to this genus, it is fairly homogeneous. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 29lb. 4oz. per cubic foot. Height, from 20 to 60ft.

Victoria, New South Wales and Queensland.

573. **Sterculia lurida,** *F.v.M.*, (Syn. *Brachychiton luridum*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 228. *Brachychiton luridum* in Muell. Cens., p. 15.

"Sycamore." "Hat Tree."

This timber is white, soft, not durable, is easily split, and is occasionally used for shingles. Diameter, 36 to 48in.; height, 80 to 100ft.

Northern New South Wales and Queensland.

574. **Sterculia quadrifida,** *R.Br.*, N.O., Sterculiaceæ, B.Fl., i., 227.

"Kurrajong." "Calool" of the aborigines of Northern New South Wales. "Convavola" of some Queensland aboriginals.

Timber soft, spongy, and little used. It is light grey, close-grained, and easily worked. Diameter, 12 to 18in.; height, 50 to 80ft.

Northern New South Wales, Queensland and Northern Australia.

575. **Strychnos psilosperma,** *F.v.M.*, N.O., Loganiaceæ, B.Fl., iv., 369.

A glabrous shrub. Wood light yellow, with numerous white longitudinal streaks, the centre black or dark, the grain close;

very hard, and tough. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland.

576. **Symplocos spicata,** *Roxb.*, (Syn. *S. Stawellii*, F.v.M.); N.O., Styraceæ, B.Fl., iv., 292.

"A moderate-sized tree." Wood white and close-grained, but apt to warp and split.

Northern New South Wales.

577. **Symplocos Thwaitesii,** *F.v.M.*, N.O., Styraceæ, B.Fl., iv., 293.

"A shrub or tree, attaining sometimes a considerable size." Wood light in colour, fine in grain, and tough.

Northern New South Wales and Queensland.

578. **Syncarpia Hillii,** *Bail.*, N.O., Myrtaceæ. (Bailey, in *Proc. R.S., Queensland*, i., 86.)

"Turpentine Tree" and "Peebeen" of the colonists and aboriginals of Frazer's Island (North Queensland).

Wood of a dark pink colour, close in the grain, and tough; a useful building wood. (Bailey.)

Frazer's Island (Queensland).

579. **Syncarpia laurifolia,** *Ten.*, (Syn. *Metrosideros glomulifera*, Smith; *M. procera*, Salisb.; *M. propinqua*, Salisb.; *Tristania albens*, A. Cunn.; *Kamptzia albens*, Nees); N.O., Myrtaceæ, B.Fl., iii., 265. *Metrosideros glomulifera* in Muell. Cens., p. 59.

"Turpentine Tree." "Booreea" of aboriginals near Sydney. "Pearbbie" of the aborigines of Frazer's Island (Queensland).

Timber valuable for piles and posts for fences, very durable underground, and said to resist the *Teredo navalis*, damp and the white ant, owing to the resinous matter contained in it. It is used for ship-building and other purposes requiring a durable timber, but it is said to be comparatively soft and brittle. My own experience is against this, it is as hard as the average Myrtaceous timber, and is not brittle when the sap-wood is removed. It takes

a high polish. When employed for uprights in buildings it is liable to warp when much exposed. It is a difficult wood to burn, as it will only char, and is consequently easily extinguished; a useful property in buildings. It is apt to shrink and warp unless it is well seasoned. "It is the best wood for railway sleepers, and posts of it have stood for twenty years." (*Jurors' Reports, London International Exhibition of* 1862.) A pile was exhibited at the Colonial and Indian Exhibition, 1886, taken from a jetty at Brisbane Water, near Sydney, where it had been fully exposed to the action of the waves of the Pacific Ocean for twelve years. It had been entirely unprotected, yet on cutting it through it was found to be perfectly free from decay and from the attacks of the *Teredo*. Many wharves in Sydney are constructed on piles made of this timber. The sap-wood is of a light colour, all the rest is dark brown. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 63lb. 2oz. per cubic foot. Diameter, 48 to 60ft.; height, 100 to 150ft.

New South Wales and Queensland.

580. **Syncarpia leptopetala,** *F.v.M.*, (Syn. *Metrosideros leptopetala*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 266. *Metrosideros leptopetala* in Muell. Cens., p. 59.

"Brush Turpentine." "Myrtle."

Timber hard, heavy, and durable; used for turnery, etc. Diameter, 24in.; height, 50 to 60ft.

New South Wales and Queensland.

581. **Synoum glandulosum,** *A. Juss.*, (Syn. *Trichilia glandulosa*, Smith); N.O., Meliaceæ, B.Fl., i., 384.

"Dogwood." "Brush Bloodwood." "Rosewood." "Mocondie" of the aboriginals of the Richmond and Clarence Rivers. "Wallaon" is an aboriginal name in the Illawarra district (New South Wales).

Timber firm, and easily worked. When fresh it is of a deep red colour, and emits a scent like that of the common rose; it is used for cabinet purposes, for which it has long been highly

valued, as well as for the inside of houses and ship-building. This wood reminds one of Cedar, but it is a little heavier, is of rather a deader colour, and it is apt to tear under the plane, hence it fetches only about half the price of Cedar in Sydney. But it polishes well, and has a sheen which is very pretty. Two slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 41lb. 5oz. and 44lb. 15oz. per cubic foot respectively. Diameter, 18 to 24in.; height, 40 to 60ft.

New South Wales and Queensland.

582. **Tarrietia actinophylla,** *Bail.*, N.O., Sterculiaceæ, Syn. Queensland Flora. (Bailey.)

A "Stavewood."

A tall tree. Wood very tough, of a stringy, straight grain, resembling English Ash; will bend better than that wood, which points it out as a suitable wood for chair making, carriage work, axe handles, etc. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

South Queensland.

583. **Tarrietia argyrodendron,** *Benth.*, (Syn. *Argyrodendron trifoliolatum*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 230.

"Silver Tree," "Black Stavewood," "Stonewood," and "Ironwood." "Boyung," "Byong," or "Boiong" of the aboriginals of Northern New South Wales.

This timber is useful for piles in water. (*General Report, Sydney International Exhibition*, 1879.) It is white, hard, close-grained, tough, and firm, and may be used as a substitute for English Beech. It is a valuable coopers' wood. Diameter, 24 to 36in.; height, 70 to 90ft.

New South Wales and Queensland.

584. **Tarrietia trifoliata,** *F.v.M.*, (Syn. *T. actinodendron*, F.v.M.); N.O., Sterculiaceæ, Muell. Cens., p. 15.

"Red Beech" of Johnstone River (Queensland).

It is not unlike common Red Cedar in appearance, but it is harder than that wood. It is used for building purposes, but soon

decays if exposed to bad weather; it is, therefore, better suited for indoor work. (H. W. Miskin.)

New South Wales and Queensland.

585. **Telopea oreades,** *F.v.M.*, N.O., Proteaceæ, B.Fl., v., 534.

"Gippsland Waratah."

The miners prefer this wood to any other for their pick handles, on account of its elasticity. It requires most careful seasoning. The young shoots or suckers are sometimes used for basket making. The New South Wales Waratah timber (*T. speciosissima*) is too small for use, but its shoots are sometimes employed. (See "Fibres.") Diameter, 1½ up to 2ft.; and height, 30 to 40ft. (Bäuerlen.)

Victoria (Gippsland), and Southern New South Wales.

586. **Terminalia bursarina,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 499.

A shrub or small tree. Wood of a dark colour, close-grained, hard, and prettily marked; useful for cabinet-work.

Northern Australia.

587. **Terminalia Catappa,** *Linn.*, N.O., Combretaceæ, Muell. Cens., p. 50.

"Indian Almond."

A large deciduous tree. Wood brown, waved, rather heavy, rather close-grained; takes a fine polish. (Kurz.) Weight of Indian specimens, 32lb. per cubic foot. (Skinner.) 41lb. (Gamble.)

Queensland.

588. **Terminalia discolor,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 501.

Wood close-grained and tough. Diameter, 3 to 6in.; height, 10 to 15ft.

Northern Australia.

589. **Terminalia melanocarpa,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 500

Timber hard and tough, splitting freely. It is close-grained, and of a light yellow colour. Diameter, 6 to 12in.; height, 15 to 25ft.

Queensland and Northern Australia.

590. **Terminalia Muelleri,** *Benth.*, (Syn. *T. microcarpa*, F.v.M.); N.O., Combretaceæ, B.Fl., ii., 500.

"A small tree in the scrub, growing to a considerable height in the ranges." Wood yellow, but pinkish towards the centre, tough, and light; suitable for axe handles. (*Cat. Queensland Timbers, Col. and Ind. Exh.*, 1886.)

Queensland.

591. **Terminalia oblongata,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 499.

A small tree. Wood light coloured, nicely marked, and suitable for cabinet-work.

Queensland.

592. **Terminalia platyphylla,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 502.

"Durin" of the aboriginals of the Flinders River.

A moderate-sized tree. Wood dark coloured, close in the grain, tough, hard, and prettily marked.

Northern Australia.

593. **Terminalia porphyrocarpa,** *F.v.M.*, N.O., Combretaceæ, B.Fl., ii., 501.

"A handsome tree." Wood of a yellow colour, nicely marked, close-grained, hard, and tough; useful for house building and cabinet-work. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland.

594. **Terminalia sericocarpa,** *F.v.M.*, N.O., Combretaceæ, Muell. Cens., p. 50.

The sap-wood light yellow, with a darker coloured heart-wood; the wood generally is hard and tough; might be suitable for chair making.

Queensland.

595. **Terminalia Thozetii,** *Benth.*, N.O., Combretaceæ, B.Fl., ii., 500.

Wood close grained and tough, of a pale yellow colour, splitting freely. Diameter, 12 to 36in.; height, 50 to 90ft.

Central Queensland.

596. **Tetranthera reticulata,** *Meissn.*, (Syn. *T. Fawcettiana*, F.v.M.; *Litsæa reticulata*, Benth.; *Cylicodaphne Fawcettiana*, F.v.M.); N.O., Laurineæ, B.Fl., v., 306. *Litsæa reticulata* in Muell. Cens., p. 4.

"Cudgerie" of the Bunya Mountains (Queensland).

"A tree of considerable size." Wood of a grey colour, close in the grain, light, and easy to work; suitable for flooring boards.

Queensland.

597. **Thespesia populnea,** *Corr.*, (Syn. *Hibiscus populneus*, Willd.); N.O., Malvaceæ, B.Fl., i. 221.

This moderate-sized evergreen tree is common on the shores of most tropical countries of both hemispheres. The wood is considered almost indestructible under water, and is, therefore, used for boat-building, besides which its hardness and durability render it valuable for cabinet-making and building purposes, while in Ceylon it is used for gunstocks. *(Treasury of Botany.)* See also Seemann *(Flora Vitiensis)*. The centre of the old stems generally decay in the way European Elms do, and the wood towards that part presents a deep claret colour. Its weight is about 50lb. per cubic foot. (Gamble.)

Queensland and Northern Australia.

598. **Timonius Rumphii,** *DC.*, (Syn. *Polyphragmon sericeum*, Desf.; *Guettarda polyphragmoides*, F.v.M.); N.O., Rubiaceæ, B.Fl., iii., 417.

Wood light in colour, close in the grain, suitable for lining boards; easily worked, and resembling somewhat the English Sycamore. It takes a good polish. It is not endemic in Australia. Diameter, 6 to 15in.; height, 20 to 40ft.

Queensland and Northern Australia.

599. **Trema aspera,** *Blume*, (Syn. *Celtis aspera*, Brongn.; *Sponia aspera*, Planch.); N.O., Urticeæ, B.Fl., vi., 158. Included by Baron Mueller in *T. cannabina*, Lour. Cens., p. 21.

"Elm." "Rough Fig." A "Kurrajong." "Peach-leaved Poison Bush" (from the impression that it is poisonous to stock).

This shrub, so abundant on the borders of scrubs, might be advantageously turned to account for making gunpowder charcoal. For this purpose stems and branches should be collected from ¾in. in diameter, taking care to cut the plant when in full sap. Char in a close vessel, extinguish by exclusion of air, not with water. (Bailey.) The timber is hard, tough, firm, close-grained, and durable. Diameter, 24 to 36in.; height, 50 to 70ft.

Victoria, New South Wales and Queensland.

600. **Trema orientalis,** *Blume*, (Syn. *Celtis orientalis*, Linn.; *Sponia orientalis*, Planch.); N.O., Urticeæ, B.Fl., vi., 158. Included in *T. cannabina*, Lour., Muell. Cens., p. 21.

Wood of a red colour, soft, and resembling Cedar. Height, up to 40ft.

New South Wales, Queensland and Northern Australia.

601. **Tristania conferta,** *R.Br.*, (Syn. *T. subverticillata*, Wendl.; *T. macrophylla*, A. Cunn.; *Lophostemon arborescens*, Schott.; *L. macrophyllum*, of nurserymen, non R.Br.); N.O., Myrtaceæ, B.Fl., iii., 263.

In Northern New South Wales it has the following names:—"White Box," "Red Box," "Brush Box," "Bastard Box," "Brisbane Box," and "Mahogany." It is the "Tubbil-pulla" of the Queensland aboriginals.

This timber is much prized for its strength and durable qualities. It is used in ship-building. Ribs of vessels from this tree have remained unimpaired for thirty years and more. (Hill.) It is also used in the construction of wharves and bridges, since it

is not likely to be attacked by white ants. It dresses well, and some specimens show, when polished, a very pretty grain. All species of Tristania timber are difficult to season, planks and slabs of the wood crack, warp, twist, and shell in the most extraordinary manner, unless the greatest care be exercised both in the time of cutting of the timber and the seasoning. Three slabs in the Technological Museum, which have been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), have weights which correspond to 59lb. 2oz., 61lb. 4oz., and 64lb. 1oz. per cubic foot. Diameter, 1 to 3ft.; height, 80 to 120ft.

New South Wales, Queensland and Northern Australia.

602. **Tristania exiliflora,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 264.

Wood of a dark colour, close in the grain, very tough and elastic; useful for tool handles.

Queensland.

603. **Tristania laurina,** *R.Br.*, (Syn. *Melaleuca laurina*, Smith); N.O., Myrtaceæ, B.Fl., iii., 264.

Called "Bastard Box" in Northern New South Wales. "Swamp Mahogany" in the counties of Cumberland and Camden (New South Wales). Other names are "Water Gum" and "Beech."

Timber dark in colour, hard, tough, and close-grained, used for tool handles, cogs of wheels, etc. It is generally sound to the centre. It is very difficult to season, but when dry it is of singular closeness and toughness. (Sir W. Macarthur.) It is apparently well adapted for all machinery purposes. (*Jurors' Reports, London International Exhibition*, 1862.) Diameter, 12 to 24in.; height, 50 to 60ft.

Victoria, New South Wales and Queensland.

604. **Tristania macrosperma,** *F.v.M.*, N.O., Myrtaceæ. (*Notes on Papuan Plants*, p. 104, Mueller.)

Wood of a straw colour, close-grained, very hard, and tough, stands well in drying, and will likely prove valuable for building purposes. (Bailey.)

Thursday Island (Torres Straits).

605. **Tristania neriifolia,** *R.Br.*, (Syn. *T. salicina*, A. Cunn.; *Melaleuca neriifolia*, *Bot. Mag.*; *M. salicifolia*, Andr.); N.O., Myrtaceæ, B.Fl., iii., 262.

Called "Water Gum" in the Illawarra district (New South Wales), also "Water Myrtle." It is the "Ooramilly" of the Illawarra aboriginals.

Timber very close and elastic; used for carpenters' mallets and the cogs of wheels in machinery (Hill); also for axe and other handles. Much valued for boat-building, but very difficult to season without rending. (Sir W. Macarthur.) A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 66lb. 9oz. per cubic foot. Diameter, 18 to 24in.; height, 80 to 100ft.

New South Wales.

606. **Tristania suaveolens,** *Smith*, (Syn. *T. depressa*, A. Cunn.; *T. rhytiphloia*, F.v.M.; *Melaleuca suaveolens*, Gærtn.); N.O., Myrtaceæ, B.Fl., iii., 262.

"Bastard Peppermint" of Northern New South Wales. Other names are "Broad-leaved Water Gum" and "Swamp Mahogany." It is the "Kibbera" of the aboriginals of the Richmond and Clarence Rivers, and the "Boolerchu" of those of Queensland.

Timber used for buggy and coach frames, tool handles, mallets, cogs of wheels, posts, etc. It is remarkably strong and elastic, tough, close-grained, and durable, but it is liable to rend in seasoning. "It is of a red colour, resembling Spanish mahogany. It is extensively used for piles, as it is found to resist the ravages of the Teredo longer than any wood as yet tried in the colony." (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Mr. Allen Ransome experimented upon a sample of this timber sent from New South Wales to the Colonial and Indian Exhibition. Although not thoroughly seasoned, boards were planed with remarkably good results, the cutters working freely, and leaving an excellent surface. Diameter, 12 to 18in.; height, 50 to 60ft.

New South Wales, Queensland and Northern Australia.

607. **Trochocarpa laurina,** *R.Br.*, (Syn. *Cyathodes laurina* Rudge); N.O., Epacrideæ, B.Fl., iv., 166.

"Beech," "Brush Cherry," and "Brush Myrtle." By the aboriginals it is called "Barranduna."

Wood hard, close-grained, tough, useful for turnery, and other purposes demanding a tough, fine-grained wood; it requires to be seasoned carefully. (Macarthur.) I can confirm the last statement. The wood is of a warm brown colour, and has a pretty grain, which would cause it to be very ornamental when polished, if it were not of such a uniform colour throughout. It is apt to tear under the plane. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 48lb. per cubic foot. Diameter, 6 to 12in.; height, 20 to 30 feet.

New South Wales and Queensland.

608. **Turræa pubescens,** *Hellen.*, (Syn. *T. Billardieri*, A. Juss.; *T. concinna*, Benn.); N.O., Meliaceæ, B.Fl., i., 379.

A shrub or small tree. Wood close-grained, and hard, the centre very dark, the outer part somewhat of a bright yellow colour. This species is not endemic in Australia.

New South Wales, Queensland and Northern Australia.

609. **Ventilago viminalis,** *Hook.*, N.O., Rhamneæ, B.Fl., i., 411.

"Supple Jack." "Thandorah" of the aboriginals of the Cloncurry River (North Queensland).

Timber hard, heavy, close-grained, and takes a good polish. It is of a dark-brown colour. Diameter, 6 to 12in.; height, 20 to 30ft.

South Australia, New South Wales, Queensland and Northern Australia.

610. **Villaresia Moorei,** *F.v.M.*, (Syn. *Mooria campylosperma*, F.v.M.); (*Cat. N.S.W. Woods, Lond. Exh.*, 1862), N.O., Olacineæ, B.Fl., i., 396.

"Maple," or "Scrub Silky Oak." Called "Belbil" by the aboriginals.

A most excellent wood, white in colour, and durable. *(General Report, Sydney International Exhibition*, 1879.) It is close-grained and prettily marked, and would make nice bedroom furniture. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 41lb. 6oz. per cubic foot. Diameter, 3 to 6ft.; height, 80 to 120ft.

Northern New South Wales.

611. **Viminaria denudata,** *Smith*, (Syn. *Sophora juncea*, Schrad.; *Pultenea juncea*, Willd.; *Daviesia denudata*, Vent.; *D. juncea*, Pers.); N.O., Leguminosæ, B.Fl., ii., 68.

"Native Broom."

Wood soft and spongy. Specific gravity, .623. (Osborne.) Height, up to 20ft.

All the colonies.

612. **Vitex acuminata,** *R.Br.*, (Syn. *V. melicopea*, F.v.M.); N.O., Verbenaceæ, B.Fl., v., 67.

"A small or large tree." Wood brown, with darker streaks, close grained; suitable for cabinet-work.

Queensland and Northern Australia.

613. **Vitex lignum-vitæ,** *A. Cunn.*, N.O., Verbenaceæ, B.Fl., v., 67.

"Lignum-Vitæ."

The wood is hard, close-grained, and of a blackish colour. It is a useful timber for the cabinet-maker. Diameter, 20 to 24in.; height, 50 to 70ft.

New South Wales and Queensland.

614. **Vitis hypoglauca,** *F.v.M.*, (Syn. *Cissus hypoglauca*, A. Gray; *C. australasica*, F.v.M.); N.O., Ampelideæ, B.Fl., i., 450.

"Native Grape." Called "Gippsland Grape" in Victoria.

A small tree. Wood soft and spongy, of a grey colour.

Victoria, New South Wales and Queensland.

615. **Vitis sterculifolia,** *F.v.M.*, N.O., Ampelideæ, B.Fl., i., 450.

A small tree. Wood light brown, soft, and spongy.

New South Wales and Queensland.

616. **Weinmannia Benthamii,** *F.v.M.*, (Syn. *Geissois Benthamii*, F.v.M.); N.O., Saxifrageæ, Muell. Cens., p. 48. *Geissois sp.*, in B.Fl., ii., 446. *Vide* Muell. Fragm., v., 180.

"Leather-jacket," or "Marrara." Called "Chum-chum" by the aboriginals of the northern part of New South Wales.

The timber is firm, close-grained, and easily wrought; used for staves and inside work. Diameter, 18 to 24in.; height, 50 to 60ft.

New South Wales and Queensland.

617. **Weinmannia lachnocarpa,** *F.v.M.*, N.O., Saxifrageæ, Muell. Cens., p. 48.

"Marrara" and "Scrub Redwood."

Wood light pink, close in the grain; might be used for making planes, mallets, and chisel handles. (*Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

New South Wales and Queensland.

618. **Weinmannia rubifolia,** *F.v.M.*, (Syn. *Geissois rubifolia*, F.v.M.); N.O., Saxifrageæ, B.Fl., ii., 445.

"Corkwood" and "Marrara."

Timber close-grained, tough, and easily wrought; considered to be an excellent timber, but not much used. Diameter, 24 to 36in.; height, 80 to 100ft.

Northern New South Wales and Queensland.

619. **Wikstrœmia indica,** *C. A. Meyer*, (Syn. *W. fœtida*, A. Gray; *W. Shuttleworthii*, Meiss.; *W. Shuttleworthiana*, Meiss.; *W. viridiflora*, Meiss.; *Daphne indica*, Linn.); N.O., Thymeleæ, B.Fl., vi., 37.

"A shrub, sometimes almost arborescent." Wood of a deep red colour, and coarse-grained. It is not endemic in Australia.

New South Wales, Queensland and Northern Australia.

620. **Wormia alata,** *R.Br.*, N.O., Dilleniaceæ, B.Fl., i., 16.

Wood of a dark colour, cut one way it shows a pretty red "clash," differing in colour, but somewhat resembling that of English Oak. It is close in grain, and easy to work; a good cabinet-makers' wood. *(Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.) The Rev. J. E. Tenison-Woods points out that there is a prejudice amongst the northern settlers against this tree, which is supposed to be the cause of fever, but the blame should rather be laid on the places where it grows.

Queensland.

621. **Wrightia saligna,** *F.v.M.*, (Syn. *Balfouria saligna*, R.Br.); N.O., Apocyneæ, B.Fl., iv., 316.

"A tall shrub or small tree." Wood of a uniform pale yellow colour, the grain close; might be useful for cabinet-work, carving, and engraving; thought to resemble English Elder. *(Cat. Queensland Woods, Col. and Ind. Exh.*, 1886.)

Queensland and Northern Australia.

622. **Xanthostemon pachyspermus,** *F.v.M. et Bail.*, N.O., Lythrarieæ. *Occasional Papers, Queensland Flora*, No. 1 (May, 1886), Bailey.

"Yellow-wood."

Wood of a grey, or yellowish colour, fine in the grain, tough, and strong.

Johnstone River (Queensland).

623. **Ximenia americana,** *Linn.*, (Syn. *X. elliptica*, Forst.; *X. laurina*, Delile.; *X. exarmata*, F.v.M.); N.O., Olacineæ, B.Fl., i., 391.

"A glabrous shrub, or sometimes a small tree." Wood close-grained, tough, hard, and yellowish in colour. It works like English Box, and might be suitable for engraving. It is used for making those peculiar pillows (kali) which the Fijians invented to prevent the derangement of their laboriously dressed hair. (Seemann.) Roxburgh says that it is sometimes used in India as a substitute for Sandal-wood.

Queensland and Northern Australia.

624. **Xylomelum pyriforme,** *Knight*, (Syn. *Banksia pyriformis*, Gærtn.; *Hakea pyriformis*, Cav.; *Conchium pyriforme*, Willd.); N.O., Proteaceæ, B.Fl., v., 408.

"Native Pear." "Wooden Pear." Used to be called "Meridja-courroo" by the aboriginals near Sydney.

This moderate-sized tree produces a dark-coloured, prettily-marked wood. It is occasionally used for making picture-frames, for ornamental cabinet-work, for veneers, and walking-sticks. When cut at right-angles to the medullary rays it has a beautiful, rich, sober marking. There is, however, little difference in the shade of colour throughout the wood. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 46lb. per cubic foot.

New South Wales.

625. **Xylomelum salicinum,** *A. Cunn.*, (Syn. *X. pyriforme* var. *salicinum*, R.Br.; *X. Scottianum*, F.v.M.; *Helicia Scottiana*, F.v.M.); N.O., Proteaceæ, B.Fl., v., 408.

A small tree. Wood of a dark red colour, close in the grain, tough, and durable.

Queensland.

626. **Zanthoxylum brachyacanthum,** *F.v.M.*, N.O., Rutaceæ, B.Fl., i., 363. *Xanthoxylum* in Muell. Cens.

"Satin-wood." "Thorny Yellow-wood." "Merrivi" of some of the Queensland aboriginals.

Timber bright yellow, soft, silky, close-grained, and easily wrought; used for cabinet-work, and possibly suitable for wood-engraving. In *Cat. Queensland Woods, Ind. and Col. Exh.*, 1886, it is alleged that this wood is superior to the wood used in England under the name of "Satin-wood." Diameter, 12 to 15in.; height, 40 to 50ft.

Northern New South Wales and Queensland.

627. **Zanthoxylum veneficum,** *Bail.*, N.O., Rutaceæ; *Cat. Queensland Woods, Ind. and Col. Exh.*, 1886. (Bailey.)

This wood has been found by Dr. Bancroft to possess poisonous properties. It is of a yellow colour, close in the grain, and easy to work.

Johnstone River (Queensland).

628. **Zieria Smithii,** *Andr.*, (Syn., *Z. lanceolata*, R.Br.; *Boronia arborescens*, F.v.M.); N.O., Rutaceæ, B.Fl., i., 306.

Colonial names are "Sandfly Bush" and "Turmeric." It is also called "Stinkwood" in Tasmania.

Wood yellowish, toughish, requires careful seasoning. Has a neat figure, though with no pretensions to beauty. A slab in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 38lb. per cubic foot.

Important Note.—The slab of timber which I have thus described and weighed is labelled *Zieria lanceolata* in the Exhibition Catalogue, but the wood is remarkably like that of an *Evodia*, and this timber may turn out to have been yielded by *E. micrococca*, F.v.M. (B.Fl., i., 361.)

All the colonies except South and Western Australia.

629. **Zizyphus Jujuba,** *Lam.*, N.O., Rhamneæ, B.Fl., i., 412.

The "Jujube Tree" of India.

A moderate-sized deciduous tree, almost evergreen. The wood is hard and reddish (Gamble), but Kurz describes it as with yellowish sap-wood, and heart-wood dark brown. It is good for charcoal. Its weight varies between 43 and 52lb. per cubic foot. (Gamble.) In India it is used for saddle trees and agricultural implements, oil mills, and other purposes.

Queensland.

630. **Zizyphus Œnoplia,** *Mill.*; (Syn., *Z. Napeca*, Roxb.; *Z. celtidifolia*, DC.; *Z. rufula*, Miq.); N.O., Rhamneæ, B.Fl., i., 412.

This straggling shrub is cultivated for hedges in India.

Northern Australia.

FIBRES.

THE list of indigenous Australian fibre-plants could be extended almost *ad infinitum*. Valuable information in regard to the utilization of some of the fibres for paper-making will be found in a paper on the subject by Baron Mueller, in the *Report of the Intercolonial Exhibition, Melbourne,* 1886. For some further references to colonial fibres, see a paper by Mr. C. Moore, on the "Fibre Plants of New South Wales." *(Trans. Philos. Soc., N.S.W.*, 1862-5.)

At present no export trade is done in fibres, as none of excellence have been found abundantly available.

The practice which aboriginals adopt of chewing fibrous plants to obtain fibre for making fishing-nets, etc., causes their teeth to be worn down to a dead level. This is one of the characteristics of an aboriginal skull.

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1. **Abroma fastuosa,** *R.Br.*, N.O., Sterculiaceæ, B.Fl., i., 236.

The Rev. J. E. Tenison-Woods says this plant was pointed out to him by Mr. Stuart as being of great value for the length and strength of its fibre. It is not endemic in Australia.

Queensland.

2. **Abutilon oxycarpum,** *F.v.M.*, (Syn. *Sida oxycarpa,* F.v.M.); N.O., Malvaceæ, B.Fl., i., 204.

The bark of this tree yields a useful fibre. This is a fibre-yielding genus.

All the colonies except Tasmania and Victoria.

3. **Acacia decurrens,** var. **mollis,** *Willd.*, (Syn. *A. mollissima,* Willd.); N.O., Leguminosæ, B.Fl., ii., 415.

"Silver Wattle." "Black Wattle" (of the older colonists of New South Wales). "Garrong" of the aboriginals of Victoria.

A sample of the bark of this tree exhibited at the London International Exhibition, 1862, seemed to the jurors "to be admirably adapted for the manufacture of paper."

All the colonies except Western Australia.

4. **Acacia penninervis,** *Sieb.*, (Syn. *A. impressa*, Lindl.); N.O., Leguminosæ, B.Fl., ii., 362.

"Blackwood."

The bark of this tree yields material which can be worked up into the coarser kinds of paper. Many other species of *Acacia* yield a bark similar in this respect.

Tasmania, Victoria, New South Wales and Queensland.

5. **Bedfordia salicina,** *DC.*, (Syn. *Senecio Bedfordii*, F.v.M.; *Cacalia salicina*, Labill.; *Culcitium salicinum*, Spreng.); N.O., Compositæ, B.Fl., iii., 673. *Senecio Bedfordii* in Muell. Cens., p. 84.

The "Dogwood" of Tasmania.

This tree yields a white flock from the under part of the leaves. The yield is about 1oz. from 1lb. of the green leaves. It is easily obtained by means of a stiff brush, or, preferably, a blunt knife. Paper could be made from it, but as a source of paper material on a commercial scale it would be insignificant. A mass of it bears a remakable resemblance to scoured merino wool.

Tasmania, Victoria and New South Wales.

6. **Bombax malabaricum,** *DC.*, (Syn. *B. heptaphyllum*, Cav.; *Salmalia malabarica*, Schott.); N.O., Malvaceæ, B.Fl., i., 223.

The "Simool Tree," or "Malabar Silk-cotton Tree" of India.

The silk-cotton of this tree, though very beautiful, is like other silk-cottons, not adapted for spinning. It is chiefly used for stuffing cushions, and a kind of quilt or thick cloth is manufactured from it in Assam. *(Treasury of Botany.)*

Queensland and Northern Australia.

7. **Careya arborea,** *Roxb.*, var. (?) **australis,** *F.v.M.*, (Syn. *C. australis*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 289. *C. australis* in Muell. Cens., p. 60.

"Go-onje" and "Gunthamarrah" of the aboriginals of the Cloncurry River (North Queensland). "Ootcho" of the aboriginals of the Mitchell River.

Of the inner bark of the typical *C. arborea,* fuses for matchlocks are made in India, by pounding, cleaning, drying, and twisting it into a thin cord. These are said to burn at the rate of 12in. per hour. Coarse strong cordage is also made from the bark. (Brandis.)

Queensland and Northern Australia.

8. **Cocus nucifera,** *Linn.*, N.O., Palmeæ, B.Fl., vii., 143.

"Cocoanut Palm."

The following account of this well-known palm is taken from the *Treasury of Botany* :—"The uses of this palm are very numerous. The outside rind or husk of the fruit yields the fibre from which the well-known cocoanut matting is manufactured. In order to obtain it the husks are soaked in salt water for six or twelve months, when the fibre is easily separated by beating, and is made up into a coarse kind of yarn, called coir. Besides its use for matting, it is extensively employed in the manufacture of cordage, being greatly valued for ships' cables, and although these cables are rough to handle, and not so neat looking as those made of hemp, their greater elasticity makes them superior for some purposes. Other articles of minor importance are now made of this fibre, such as clothes and other brushes, brooms, mats, etc.; and when curled and dried it is used for stuffing cushions, mattresses, etc., as a substitute for horsehair. The leaves are greatly used for thatching houses, for plaiting into mats, baskets, hats, and similar articles; and from strips of the hard footstalk very neat combs for the hair are made. The brown fibrous network from the base of the leaves is substituted for sieves, and also made into fishermen's garments in the tropics."

Queensland.

9. **Commersonia echinata,** *Forst.*, N.O., Sterculiaceæ, B.Fl., i., 243.

"Brown Kurrajong."

The aboriginals use the fibre of the bark for kangaroo and fishing nets. A great deal of crushing is necessary to extract the fibre, as the bark contains a very large quantity of mucilaginous matter, which is exceedingly difficult to remove either by hot or cold water, but which, however, can be removed by alkalis. The fibre is very long, and not interlaced like that from *Laportea gigas*; it is very strong when moist, but becomes hard and breaks more readily when dry; this is owing to the glutinous matter, which remains in it and dries hard. (H. Lardner.) A thorough and complete crushing seems absolutely necessary before it can be cleaned. This plant is not endemic in Australia.

Northern New South Wales and Queensland.

10. **Cordia Myxa,** *Linn.*, N.O., Borragineæ, B.Fl., iv., 386. (For synonyms, see p. 19.)

The "Sebesten Plum" of India.

In India the bark is made into ropes, and the fibre is used for caulking boats. The leaves are used as plates, and in Pegu to cover Burmese cheroots. (Gamble.)

Queensland.

11. **Crotalaria juncea,** *Linn.*, (Syn. *C. oblongifolia*, Hook.; *C. Mitchelli*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 179.

The "Sunn Hemp" of India.

This plant is extensively cultivated in various parts of Southern Asia, particularly in India, on account of the valuable fibre yielded by its inner bark. The stems, after being cut, are steeped in water for two or three days in order to loosen the bark; they are then taken out in handfuls and bent so as to break the interior wood without injuring the fibre; the operator then beats upon the surface of the water until the fibrous part is entirely separated, when it is washed and hung upon bamboo poles to dry, and afterwards combed to separate the filaments from each other. The fibre thus obtained is very strong, and is considered to be equal, if not superior, to some kinds of Russian hemp; it is employed for

cordage, canvas, and all the ordinary purposes of hemp. *(Treasury of Botany.)*

Queensland and Northern Australia.

12. **Cyperus vaginatus,** *R.Br.*, N.O., Cyperaceæ, B.Fl., vii., 273.

This plant yields fibre for fishing nets and cordage, as do many others of this genus. It used to be very largely used by the aboriginals, and is still, to some extent.

All the colonies except Tasmania.

13. **Dianella lævis** var. **aspera,** *R.Br.*, (Syn. *D. elegans*, Kunth); N.O., Liliaceæ, B.Fl., vii., 15. Included in *D. longifolia*, R.Br., in Muell. Cens., p. 117.

"Flax Lily."

The fibre is strong, and of a silky texture. The aboriginals formerly used it for making baskets, etc.

All the colonies except Western Australia.

14. **Dodonæa viscosa,** *Linn.*, (Syn. *D. dioica*, Roxb.; *D. angustifolia*, Linn. f.); N.O., Sapindaceæ, B.Fl., i., 475.

"Hop Bush." Called "Switch Sorrel" in Jamaica, and according to Dr. Bennett, "Apiri" in Tahiti.

"Fillets of it were once used for binding round the heads and waists of Tahitian victors after a battle, and during the pursuit of the vanquished." Bennett *(Gatherings of a Naturalist)*.

Found in all the colonies.

15. **Doryanthes excelsa,** *Corr.*, N.O., Amaryllideæ, B.Fl., vi., 452.

"Spear Lily." "Giant Lily."

The leaves are a mass of fibre, of great strength, which admits of preparation either by boiling or maceration, no perceptible difference as to quality or colour being apparent after heckling. Suitable for brush making, matting, etc.

New South Wales and Queensland.

16. **Doryanthes Palmeri,** *Hill*, N.O., Amaryllideæ, B.Fl., vi., 452.

A "Spear Lily."

See *D. excelsa*.

Queensland.

17. **Eucalyptus amygdalina,** *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 202.

"Messmate." (For other botanical and vernacular names, see "Timbers.")

The inner bark is adapted for the preparation of all kinds of coarse paper. Following are a few of the Eucalypts which have a more or less stringy bark, but they by no means exhaust the list.

Tasmania, Victoria and New South Wales.

18. **Eucalyptus capitellata,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 206.

"Stringybark." (For other botanical and vernacular synonyms, see "Timbers.")

The bark of this tree makes very fair door mats.

Southern New South Wales and Eastern Victoria.

19. **Eucalyptus globulus,** *Labill.*, N.O., Myrtaceæ, B.Fl., iii., 225. (For synonyms, see p. 449.)

"Blue Gum." "Ballook" of the Gippsland aboriginals.

It has been suggested that the bark-fibre of this tree may prove useful for making the coarser kinds of paper.

Tasmania, Victoria and New South Wales.

20. **Eucalyptus goniocalyx,** *F.v.M.*, (Syn. *E. elæophora*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 229.

"Mountain Ash." (For other vernacular names, see "Timbers.")

This is another Eucalypt whose bark makes very good packing paper.

Victoria and Southern New South Wales.

21. **Eucalyptus macrorrhyncha,** *F.v.M.*, (Syn. *E. acervula*, Miq.); N.O., Myrtaceæ, B.Fl., iii., 207.

The ordinary "Stringybark" of Victoria. (For other vernacular names, see "Timbers.")

The thick fibrous bark, which is persistent on the branches as well as the stem, when removed in large sheets and levelled and dried under some pressure, is extensively used for roofing huts, sheds, and stables where the tree occurs; for this purpose it

will last about twenty years. The inner layers of the bark are tough, and may be used for tying material.

Victoria and Southern New South Wales.

22. **Eucalyptus obliqua,** *L'Hér.*, N.O., Myrtaceæ, B.Fl., iii., 204.

A "Stringybark." (For other vernacular names and synonyms, see "Timbers.")

In the bush the bark from the stems of old trees is used for thatching buildings, and for door mats, and Baron Mueller has made good paper out of the bark, suitable for writing, printing, and packing, also mill and paste boards. The blacks in the southern portion of New South Wales use it for making fishing nets and lines, and also baskets. The farmers in parts of New South Wales also make excellent rope from this material, which they put to a variety of purposes, *e.g.*, leg ropes for cows, bands for hay, etc., and it is very durable. One of these leg ropes, which has been constantly in use for two years by a farmer near Braidwood, New South Wales, is now in the Technological Museum, and it is by no means worn out.

New South Wales, Victoria, Tasmania and South Australia.

23. **Ficus macrophylla,** *Desf.*, N.O., Urticeæ, B.Fl., vi., 170.

"Moreton Bay Fig." "Karreuaira" and "Waabie" of the aboriginals.

The fibre of the root of this tree is of great durability, and is used by the aborigines in the fabrication of their scoop fishing nets. The inner bark forms a loose fabric if taken off carefully.

Northern New South Wales and Queensland.

24. **Flagellaria indica,** *Linn.*, N.O., Liliaceæ, B.Fl., vii., 10.

"Lawyer Vine."

The leaves are used for cordage. This plant is not endemic in Australia.

North and South Queensland, and Northern New South Wales.

25. **Gymnostachyus anceps,** *R.Br.*, N.O., Aroideæ, B.Fl., viii., 157.

"Travellers' Grass." "Settlers' Twine." A "Sword-sedge."

Yields a coarse, strong fibre. When farmers use it for any purpose where particular strength is required, such as sewing up bags, or tying the legs of pigs, etc., to take to market, they usually singe the leaves by drawing them through the fire or through hot ashes.

New South Wales and Queensland.

26. **Hibiscus heterophyllus,** *Vent.*, (Syn. *H. grandiflorus*, Salisb.); N.O., Malvaceæ, B.Fl., i., 212.

"Green Kurrajong." "Dtharange-gange" of some New South Wales aboriginals.

The fibre is white, strong, of fine texture, and is prepared by maceration. This is one of the fibres of which the aborigines commonly make their dilly-bags. It is difficult to clean, owing to the great amount of mucilage in the bark.

New South Wales and Queensland.

27. **Hibiscus splendens,** *Fraser*, (Syn. *Abelmoschus splendens*, Walp.); N.O., Malvaceæ, B.Fl., i., 213.

"Hollyhock Tree."

The fibre obtained from the inner bark is very strong and of fine texture. It is prepared by maceration.

New South Wales and Queensland.

28. **Hibiscus tiliaceus,** *Linn.*, (Syn. *Paritium tiliaceum*, St. Hil.); N.O., Malvaceæ, B.Fl., i., 218.

"Cotton Tree." "Talwalpin" of the aboriginals.

The fibre of the bark is used for nets and fishing lines by the aborigines. Some fibre from this tree produced in this colony was pronounced by the jurors of the London International Exhibition of 1862 to be only fit for paper making. Nevertheless, Royle *(Fibrous Plants of India)* says: "The Hawaiians make fine matting from it, and likewise manufacture it into ropes and cords. Voyagers relate that these filaments are adapted to any kind of cordage, even for the rigging of vessels, but rope thus made is not nearly so strong as that prepared from hemp. It is said to gain in strength when tarred. The whips with which the negroes in the West Indies used to be punished are said to have been made with

the bark of this species." In Fiji the bark of this tree is used in the manufacture of the waistband *(liku)* of the women. (Seemann.) Diameter, 6 to 8in.; height, 20 to 50ft.

New South Wales, Queensland and Northern Australia.

29. **Juncus pallidus,** *R.Br.*; (Syn., *J. vaginatus*, E. Mey. non R.Br.; *J. correctus*, Steud.); N.O., Juncaceæ, B.Fl., vii., 130.

"Toolim" of the aboriginals of the Coranderrk Station (Victoria).

The pith of this rush used to be made into head-dresses in Hobart.

All the colonies.

30. **Lagunaria Patersoni,** *Don*, N.O., Malvaceæ, B.Fl., i., 218.

The fibre is prepared by maceration of the bark. It is very beautiful.

New South Wales and Queensland.

31. **Laportea gigas,** *Wedd.*; (Syn., *Urtica gigas*, A. Cunn.; *Urera rotundifolia*, Wedd.; *U. excelsa*, Wedd.); N.O., Urticeæ, B.Fl., vi., 191.

"Giant Nettle Tree." "Irtaie" of the aboriginals of the Richmond and Clarence Rivers. "Goo-mao-mah" is another aboriginal name.

The bark of this tree yields an excellent fibre, of good colour. The inner bark can be beaten into a kind of coarse cloth, similar to the Tapa cloth made by the South Sea Islanders from *Broussonetia papyrifera*. The tree is abundant, and the fibre could, if necessary, be produced in large quantities. The best and strongest fibre is obtained from the root-bark. Crushing and beating seems to be the only method of separating the fibre; steeping in water will not succeed, as the whole of the bark mats together. The aborigines make most of their nets and lines (Clarence district) with this fibre, the only further preparation that it receives from them is chewing it. The wood is soft and fibrous, and might be pulped up for paper.

New South Wales and Queensland.

32. **Laportea photiniphylla,** *Wedd.*, (Syn. *Urtica photiniophylla*, A. Cunn.; *Fleurya photiniphylla*, Kunth); N.O., Urticeæ, B.Fl., vi., 192.

"Small-leaved Nettle."

The inner-bark yields a good description of fibre, which is used by the aborigines for various purposes, such as cordage, fishing nets, and dilly bags.

New South Wales and Queensland.

33. **Lavatera plebeia,** *Sims*, (Syn. *L. Behriana*, Schlecht.; *Malva Behriana*, Schlecht.; *M. Preissiana*, Miq.); N.O., Malvaceæ, B.Fl., i., 185.

"Tree Mallow."

This plant has been successfully tried for rope and paper making. In the latter case it is pulled up by the roots and hung up to dry; when dry, it is chopped up small, treated with alkali to remove the gummy matter, and after ordinary bleaching, may be used like rags. It is used by the aboriginals for baskets and fishing lines. (Guilfoyle.)

All the colonies except Western Australia.

34. **Lepidosperma gladiatum,** *Labill.*, (Syn. *L. ensatum*, Nees); N.O., Cyperaceæ, B.Fl., vii., 387.

A "Sword-sedge."

This plant yields an excellent paper material. For remarks on its applicability as a fibre, see *Proc. R.S., Vict.*, 1860, p. 208.

All the colonies except Queensland.

35. **Linum marginale,** *A. Cunn.*, (Syn. *L. angustifolium*, DC.); N.O., Lineæ, B.Fl., i., 283.

"Native Flax."

Although a smaller plant than the true flax, this plant yields fibre of excellent quality. It is used by the blacks for making fishing nets and cordage.

Throughout the colonies.

36. **Livistona australis,** *R.Br.*, (Syn. *L. inermis*, Wendl.; *Corpyha australis*, R.Br.); N.O., Palmæ, B.Fl., vii., 146.

"Palm Cabbage," or "Cabbage Palm."

The leaves are used for baskets. The unexpanded fronds, prepared by being immersed in boiling water, are dried, and the fibre thus obtained is much valued for the manufacture of hats, which much resemble the celebrated Panama hats.

Victoria, New South Wales and Queensland.

37. **Lyonsia straminea,** *R.Br.*, N.O., Apocyneæ, B.Fl., iv., 321.

The fibre of the bark is fine and strong.

Tasmania, Victoria and New South Wales.

38. **Lysicarpus ternifolius,** *F.v.M.*, (Syn. *Tristania angustifolia*, Hook.); N.O., Myrtaceæ, B.Fl., iii., 267. *Metrosideros ternifolia*, F.v.M. in Muell. Cens., p. 59.

Called "Stringybark" in Northern Queensland. Another local name is "Tom Russell's Mahogany."

The fibre of the bark is of such a superior quality that it has been sought for by rope and paper makers, but hitherto the price offered has not been sufficient inducement for its collection. (Tenison-Woods.)

Queensland.

39. **Macrozamia spiralis,** *Miq.*, (Syn. *Zamia spiralis*, R.Br.; *Encephalartos spiralis*, Lehm.); N.O., Cycadeæ, B.Fl., vi., 251. *Encephalartos spiralis* in Muell. Cens., p. 110.

"Burrawang."

A kind of "Pulu" is obtained from the leaves of this plant, which is occasionally used for mattress and couch stuffing. It would seem tedious to collect, but if the fronds are cut and left lying exposed to sun and wind for a few days, the "pulu" comes off quite easily, and often can be found loose on the ground. It is plentiful enough in certain districts for children to collect it profitably.

New South Wales and Queensland.

40. **Melaleuca spp.,** N.O., Myrtaceæ.

Several species of *Melaleuca* have a thin papery bark which tears off in several layers. It was used, amongst other purposes, by the aboriginal women to wrap their children in.

41. **Melaleuca ericifolia,** *Smith*, (Syn. *M. nodosa*, Sieb. non Smith; *M. Gunniana*, Schau.; *M. heliophila*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 159.

Baron Mueller suggests that the friable lamellar bark of this tree may be converted into blotting-paper, and even into filtering-paper.

All the colonies except Western Australia.

42. **Melaleuca styphelioides,** *Smith*, N.O., Myrtaceæ, B.Fl., iii., 144.

"Black, or Prickly-leaved Tea-tree." "Naambaar" of the aboriginals of the Illawarra district (New South Wales).

The bark is used for packing, and for caulking boats and other purposes.

New South Wales and Queensland.

43. **Pandanus odoratissimus,** *Linn. fil.*, N.O., Pandaneæ, B.Fl., vii., 148.

"Screw Pine."

The leaves of this tree are in India, Ceylon, etc., extensively manufactured into mats, baskets, and hats. The fibre of the leaf is white, soft, glossy, ill-suited for cordage, but it has been found well adapted for the preparation of a good quality of paper, also for good sacking. Its fibrous aerial roots are much employed as paint brushes. The fusiform roots are composed of tough fibres, which basket-makers split and use to tie their work with; they are also so soft and spongy as to serve the natives for corks. In the Mauritius, its leaves are employed for package bags for the transport of coffee, sugar, and grain. As soon as gathered, the spines on their edges and dorsal nerve are stripped off, and the leaf divided into strips of the breadth proper for the use they are required for; this operation is performed with the blade of a common straight knife; they are then laid in the sun for a few hours to dry. When required for working into mats, the slips are passed under the blade of a knife, applied with moderate pressure, to remove all asperities on their surface, which gives them a polish, and makes them plain and more convenient to the hands. The leaves are also made into a kind of sleeping mat by the

natives of Southern India and the South Sea Islands. They are also used to make the common umbrellas used by the Tamils. (*Cyclop. of India.*)

Northern Australia.

44. **Philydrum lanuginosum,** *Banks*, B.Fl., vii., 74.

The leaves used to be used for the girdles of aboriginal women. (Hooker.)

Victoria, New South Wales, Queensland and Northern Australia.

45. **Phragmites communis,** *Trin.*, (Syn. *Arundo Phragmites*, Linn.); N.O., Gramineæ, B.Fl., vii., 636. *Arundo Phragmites* in Muell. Cens., p. 135.

This rush was formerly much utilised by the aboriginals of Victoria for making bags or baskets. It is not valuable for agricultural purposes, but it is of great importance for binding the earth on river banks with its extensively creeping root-stocks. The plant is not endemic in Australia.

The dry plant yields 4.7 per cent. of ash, which, according to Schulz-Fleeth, contains in 100 parts:

Potash (anhydrous)	8.6
Lime	5.9
Magnesia	1.2
Ferric Oxide	0.2
Sulphuric Acid (anhydride)	2.8
Silica	71.5
Carbonic Acid	6.6
Phosphoric Acid (P_2O_5)	2.0
Sodium Chloride (common salt) ...	0.4

(*Watts' Dict.*, i., 413.)

All the colonies.

46. **Pimelea ligustrina,** *R.Br.*, (Syn. *P. elata*, F.v.M.; *Calyptrostegia ligustrina*, C. A. Mey.); N.O., Thymelaceæ, B.Fl., vi., 18; **P. axiflora,** *F.v.M.*, B.Fl., vi., 26.

The bark yielded from every portion of each of these plants furnishes an excellent fibre of great strength. That from *P. axiflora* is preferable. Other species of *Pimelea, e.g., P. pauciflora* and *P. microcephala*, are used by the aboriginals for fibre.

South Australia, Tasmania, Victoria and New South Wales *(Pimelea ligustrina)*; Tasmania, Victoria and New South Wales *(P. axiflora)*.

47. **Pimelea clavata,** *Labill.*, (Syn., *P. viridula*, Lindl.); N.O., Thymeleæ, B.Fl., vi., 25.

This plant yields a fibre used by the aboriginals for fishing nets and cordage.

Western Australia.

48. **Pipturus argenteus,** *Wedd.*, (Syn. *P. propinquus*, Wedd.; *Urtica gigantea*, Forst.); N.O., Urticeæ, B.Fl., vi., 185. *P. propinquus* in Muell. Cens., p. 22.

"Queensland Grass-cloth Plant," or "Native Mulberry." "Kongangu" and "Coomeroo-coomeroo" of the aboriginals.

The inner bark affords a fibre of fine texture and great strength; it is, however, rather difficult of preparation. It is not endemic in Australia.

New South Wales and Queensland.

49. **Plagianthus pulchellus,** *A. Gray*, (Syn., *Sida pulchella*, Bonpl.; *Abutilon pulchellum*, G. Don); N.O., Malvaceæ, B.Fl., i., 189.

"Hemp Bush."

The fibre from this plant is longer in staple than Queensland Hemp *(Sida rhombifolia)*, is soft and glossy, and should form a good warp yarn, either by itself, or as a mixture with some other material.

Tasmania, Victoria and New South Wales.

50. **Plagianthus sidoides,** *Hook.*, (Syn., *P. Lampenii*, Lindl.; *Sida discolor*, Hook.; *Asterotrichon sidoides*, Klotzsch); N.O., Malvaceæ, B.Fl., i., 188.

"Tasmanian Kurrajong."

This shrub grows quickly, and the fibre from it is very strong. The bark may be stripped off very readily, even to the points of the smallest twigs, by cutting round the stem.

Tasmania.

51. **Poa cæspitosa,** *Forst.*, (Syn., *P. australis*, R.Br.; *P. lævis*, R.Br.; *P. plebeia*, R.Br.; *P. affinis*, R.Br.); N.O., Gramineæ, B.Fl., vii., 651.

"Wiry-grass." Called "Bowat" by the Yarra (Victoria) aboriginals.

The different varieties of this grass afford excellent paper material. It was formerly used by the Yarra blacks for making their net bags *(Ballang-cowat)*. This species is not endemic in Australia.

All the colonies.

52. **Psoralea Archeri,** *F.v.M.*, N.O., Leguminosæ, B.Fl., ii., 190.

"Wommo" of the natives of the Cloncurry River (Northern Queensland).

This plant is used by the natives in making cordage. For this purpose the plants are pulled up and soaked some hours in water, after which they are taken out of the water and left to dry, when the bark is peeled off, and the fibre manufactured into strong twine and cordage. (E. Palmer.)

Northern Australia.

53. **Ptychosperma elegans,** *Blume*, (Syn., *Seaforthia elegans*, R.Br.); N.O., Palmeæ, B.Fl., vii., 141.

"Bangalow."

The leaves are used by the aboriginals for water baskets.

Queensland.

54. **Rulingia pannosa,** *R.Br.*; (Syn., *Commersonia dasyphylla*, Andr.; *Buettneria dasyphylla*, J. Gay; *B. pannosa*, DC.); N.O., Sterculiaceæ, B.Fl., i., 238. *Commersonia dasyphylla* in Muell. Cens., p. 16.

"Black Kurrajong." "Kerrawah" of the aboriginals.

This tree yields a very useful fibre.

Victoria, New South Wales and Queensland.

55. **Scirpus lacustris,** *Linn.*, (Syn., *S. Meyenii*, Nees); N.O., Cyperaceæ, B.Fl., vii., 333.

In 1875 an application was made (but lapsed) at the Patent Office, Melbourne, for the manufacture of hats from this rush. "This is cut by a series of knives. . . . The first cut leaves the rush in flat pieces $\frac{3}{32}$ of an inch thick, and a second cut leaves the pith of the rush in lengths $\frac{3}{32}$ of an inch square. These cut piths and rushes are then spun into a rope in a paper envelope, and built up into a helmet hat, or sun-shade, in the usual manner." This plant is not endemic in Australia.

All the colonies.

56. **Sesbania aculeata,** *Pers.*, (Syn. *S. australis*, F.v.M.); N.O., Leguminosæ, B.Fl., ii., 213.

"Nardoo" of the aboriginals of the Norman River (Northern Queensland). "Danchi" of India.

This plant is cultivated in India for its fibre, which, though coarse, is of great strength, and very durable in water or when repeatedly wetted, and is, consequently, valuable for the ropes of fishing nets, etc.; but it is not suitable for ships' cordage, as it contracts very much when wet. It is found also in the West Indies, and in tropical Africa. *(Treasury of Botany.)*

South Australia, New South Wales to Northern Australia.

57. **Sida rhombifolia,** *Linn.*, (Syn. *S. retusa*, Linn.); N.O., Malvaceæ, B.Fl., i., 196.

"Queensland Hemp." Called "Paddy Lucerne" on the Richmond and Clarence Rivers (New South Wales).

This is the greatest pest in cultivated lands in parts of Queensland and New South Wales. It yields a long splendid fibre, and could be produced in any quantity. It is not endemic in Australia.

South Australia, New South Wales, Queensland and Northern Australia.

58. **Sterculia acerifolia,** *A. Cunn.*, (Syn. *Brachychiton acerifolium*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton acerifolium* in Muell. Cens., p. 15.

"Flame-tree." "Lacebark-tree."

The bark is fully 2in. thick when the tree is full grown, and furnishes bast of a most beautiful lace-like texture. The fibre is very simply prepared by steeping, and is suitable for cordage and nets, ropes, mats, baskets, etc., and is useful as a paper material. The tow is of a very elastic nature, and is suitable for upholstering purposes, such as stuffing mattresses or pillows. (Guilfoyle.)

New South Wales and Queensland.

59. **Sterculia diversifolia,** *G. Don.*, (Syn. *Pœcilodermis populnea*, Schott.; *Brachychiton populneum*, R.Br.); N.O., Sterculiaceæ, B.Fl., i., 229. *Brachychiton populneum* in Muell. Cens., p. 15.

"Black Kurrajong." "Bottle-tree" of Victoria.

A strong fibre is obtained from the bark. It is used by the aboriginals for making fishing nets, both in East and West Australia. Almost, if not all, the species of *Sterculia* are used by the aboriginals for a similar purpose.

Victoria, New South Wales and Queensland.

60. **Sterculia lurida,** *F.v.M.*, (Syn. *Brachychiton luridum*, F.v.M.); N.O., Sterculiaceæ, B.Fl., i., 228. *Brachychiton luridum* in Muell. Cens., p. 15.

"Sycamore." "Hat-tree."

The bark yields a strong and valuable fibre, similar to bass or Russia matting.

Northern New South Wales and Queensland.

61. **Sterculia quadrifida,** *R.Br.*, N.O., Sterculiaceæ, B.Fl., i., 227.

A "Kurrajong." "Calool" of the aborigines of Northern New South Wales.

The fibre of the bark is used for making nets and fishing lines.

Northern New South Wales, Queensland and Northern Australia.

62. **Telopea speciosissima,** *R.Br.*, N.O., Proteaceæ, B.Fl., v., 534. (For synonyms, see p. 62.)

"Waratah," or "Warratau." "Native Tulip."

In the early days of the colony the smiths used to give the aborigines trifles for a supply of stems of this plant, which they used for twisting round their punches and other implements while working heated iron.

New South Wales.

63. **Thespesia populnea,** *Corr.*, (Syn. *Hibiscus populneus*, Willd.); N.O., Malvaceæ, B.Fl., i., 221.

The inner bark of the young branches yields a tough fibre, fit for cordage, and used in Demerara for making coffee bags, and the finer pieces of it for cigar envelopes. *(Treasury of Botany.)*

Queensland and Northern Australia.

64. **Typha angustifolia,** *Linn.*, N.O., Typhaceæ, B.Fl., vii., 159.

A "Bullrush." (For other vernacular names and synonyms, see "Foods.")

The soft woolly inflorescence of the male spadix is applied like cotton to wounds and ulcers in India. (Dymock.) The leaves are used for making mats. This plant is used in the construction of buoyant mattresses in the Italian navy, and in bringing the subject before the Royal Society of Tasmania *(Proc.* 1882, p. 163), Mr. James Barnard gives a very full account of all the numerous uses recorded of the species.

Throughout the colonies.

65. **Urena lobata,** *Linn.*, N.O., Malvaceæ, B.Fl., i., 206.

The inner bark of this plant yields abundance of fibre, resembling jute rather than flax or hemp. *(Treasury of Botany.)* This plant is not endemic in Australia.

Queensland and Northern Australia.

66. **Xerotes spp,** especially **X. longifolia,** *R.Br.*, (Syn. *Lomandra longifolia*, Labill.); N.O., Juncaceæ, B.Fl., vii., 97.

Called "Karawun" by the Yarra (Victoria) aboriginals.

The leaves are used for basket work by the aboriginals.

Throughout the colonies.

67. **Zostera nana,** *Roth.*, (Syn. *Z. marina*, Hook f.; *Z. Muelleri*, Irmisch); N.O., Naiadeæ, B.Fl., vii., 176.

"Grass Wrack" of England.

In the early days of the colonization of New South Wales this sea-weed was used for stuffing mattresses. (Woolls.) In Europe this plant is collected and used as a substitute for hay in packing.

Coasts of South Australia, Tasmania, Victoria and New South Wales.

PLANTS HAVING MISCELLANEOUS USES

NOT BEFORE ENUMERATED.

1. **Abrus precatorius,** *Linn.*, (Syn. *A. pauciflorus*, Desv.; *A. squamulosus*, E. Mey.); N.O., Leguminosæ, B.Fl., ii., 270.

"Crabs' Eyes." "Jequirity Seeds."

This plant is a native of most tropical regions. The seeds are highly ornamental, being of a brilliant scarlet, with a black scar indicating where they were attached to the pods. They weigh uniformly one and a half to two grains each, and are used by Indian jewellers as a standard of weight. Their use for this purpose has been commemorated in a couplet, which may thus be translated: "My rank is of the highest, said the gold to the goldsmith, shall I be weighed against that black-faced seed?" (Dymock.) It is said that the Koh-i-noor was measured by these seeds. They are formed into necklaces, bracelets, and other articles of adornment. They often enter into the decoration of implements of New Guinea and South Sea Island natives. They are called "Crabs' Eyes" from a fancied resemblance to those objects.

Queensland and Northern Australia.

2. **Acacia longifolia** var. **Sophoræ,** *Willd.*, (Syn. *A. Sophoræ*, R. Brown; *Mimosa Sophoræ*, Labill.); N.O., Leguminosæ, B.Fl., ii., 398.

This tree grows very quickly, and is excellent for preventing the encroachments of coast sand.

Sea-coast from Southern Queensland to South Australia and Tasmania.

3. **Acæna ovina,** *A. Cunn.*, (Syn. *A. echinata*, Nees., *A. Behriana*, Schlecht.); N.O., Rosaceæ, B.Fl., ii., 433.

This weed is very troublesome in some districts, owing to the bristles of the fruit getting entangled in the wool of the sheep; it is also a pest to housewives from their adhering to linen exposed to dry on the grass; and, as well as many of the species, a common annoyance to travellers through catching in their clothes. *(Treasury of Botany.)*

All the colonies.

4. **Adenanthera pavonina,** *Linn.*, N.O., Leguminosæ, Muell. Cens., p. 43.

"Barricarri" of India.

The seeds are of a brilliant scarlet colour, and are strung together to form ornaments for personal adornment. In India advantage is taken of their uniformity of weight (about 4 grains each) to use them as weights. Powdered, and mixed with borax, they form an adhesive substance. *(Treasury of Botany.)*

Northern Queensland.

5. **Ægiceras majus,** *Gaertn.;* (Syn., *Æ. fragrans*, Kœn.; *Æ. corniculata*, Blanco); N.O., Myrsineæ, B.Fl., iv., 277.

"River Mangrove."

Useful for consolidating sea shores liable to floods. Other mangroves are useful for this purpose. This plant is not endemic in Australia.

New South Wales, Queensland and Northern Australia.

6. **Albizzia lophantha,** *Benth.;* (Syn., *Acacia lophantha*, Willd.; *Mimosa distachya*, Vent.; *M. elegans*, Andr.); N.O., Leguminosæ, B.Fl., ii., 421.

The dry root contains about 10 per cent. of saponin. (Rummel.)

Western Australia.

7. **Ardisia pseudo-jambosa,** *F.v.M.*, N.O., Myrsineæ, B.Fl., iv., 276.

"Gaon-Gaon" of some Central Queensland aboriginals.

This is but a shrub, and, therefore, insignificant as a timber-tree, but Mons. Thozet points out that it well deserves a place in

every garden, on account of its handsome globular, crimson fruit, the size of a cherry.

New South Wales and Queensland.

8. **Avicennia officinalis,** *Linn.*, (Syn., *A. tomentosa*, Jacq.); N.O., Verbenaceæ, B.Fl., v., 69.

"Mangrove." (For other vernacular names, see "Timbers.")

The ashes of this tree are used in the manufacture of soap. This plant is not endemic in Australia.

In salt-water estuaries entirely round the coast.

9. **Banksia spp.,** N.O., Proteaceæ.

"Honeysuckle."

The smaller and barren cones, being porous, were used with fat by the bushmen in the early days of the colony as night lights. (Melville.)

Throughout the colonies.

10. **Boronia megastigma,** *Nees*, (Syn. *B. tristis*, Turcz.); N.O., Rutaceæ, B.Fl., i., 315.

Baron Mueller suggests that this plant be cultivated for grave decoration, on account of its external blackish flowers. The flowers have also been suggested as a flavouring agent for tea, as they somewhat resemble in aroma those of *Chloranthus inconspicuus* used in China for that purpose.

Western Australia.

11. **Cassytha filiformis,** *Linn.*, (Syn. *C. guineensis*, Schum.); N.O., Laurineæ, B.Fl., v., 311.

A "Dodder Laurel."

Crushed with gingelly oil, this plant is used in India as a head wash for strengthening the hair.

Queensland and Northern Australia.

Tasmariops **Candolleana,** *Arn.*, (Syn. *Rhizophora Timoriensis*,); N.O., Rhizophoreæ, B.Fl., ii., 494.

3. **Acæna** plant is also a native of the shores of tropical Asia.
Schlec has the curious habit of germinating and protruding

from the fruit while still attached to the bough. *(Treasury of Botany.)* The bark of this tree is used as a litter for cattle in India. (Brandis.)

Queensland and Northern Australia.

13. **Colubrina asiatica,** *Brongn.*, (Syn. *Ceanothus asiaticus*, Linn.; *C. capsularis*, Forst.; *Rhamnus lævigatus*, Sol.); N.O., Rhamneæ, B.Fl., i., 413.

The natives of Fiji use the leaves of this shrub for washing their hair, to clean it and to destroy the vermin. (Seemann.)

Queensland and Northern Australia.

14. **Cordia Myxa,** *Linn.*, N.O., Borragineæ, B.Fl., iv., 386. (For synonyms, see p. 19.)

The "Sebesten Plum" of India.

The viscid pulp of the fruit is used as bird lime in India, and the kernel is used for making linen, but the mark is fugacious.

Queensland.

15. **D'Urvillea potatorum,** *Aresch.* N.O., Algæ. Plate CCC, Harvey's *Phycologia Australasica.*

Labillardière observed that the natives of Tasmania used portions of its great leaves, folded in the form of a pouch, for the purpose of keeping fresh water.

South coast of Australia and Tasmania.

16. **Entada scandens,** *Benth.*, (Syn. *E. Pursætha*, DC.; *Mimosa scandens*, *Linn.*); N.O., Leguminosæ, B.Fl., ii., 298. *E. Pursætha* in Muell. Cens., p. 43.

"Queensland Bean." "Leichhardt Bean."

The kernels are used by the Nepalese for washing their hair, and in Bengal by washermen for crimping linen. (Gamble, *Manual of Indian Timbers.)*

Queensland.

17. **Eucalyptus corymbosa,** *Smith*, (Bloodwood); **E. maculata,** *Hook., f.*, (Spotted Gum); **E. siderophloia,** *Benth.*, (Ironbark), B.Fl., iii., 254 and 456, N.O., Myrtaceæ.

Occasionally the concentric shells which form in the timber of these trees is filled more or less completely by a fungus apparently the same as the "German Tinder" (Amadou) of Europe. It is beautifully soft, and frequently closely resembles chamois leather in texture and general appearance. It has been obtained in pieces two or three feet wide. I have seen the fungus from the two first-mentioned trees, but in communicating with the Rev. Dr. Woolls, that gentleman points out that not only has he seen large pieces of it taken from the wood of the last tree, but he also kindly gives me the following information: "The fungus is *Xylostroma giganteum*, Fries, which possesses no pileus, and destroys the wood of the firmest and most solid character." Dr. Woolls found it near Parramatta. Mr. Bäuerlen has brought it to me from near Cambewarra. Since the above was written the author has seen it from *E. amygdalina* also.

New South Wales to Northern Australia *(E. corymbosa)*; New South Wales to Queensland *(E. maculata)*; New South Wales to Queensland *(E. siderophloia)*.

18. **Eucalyptus cosmophylla,** *F.v.M.*, N.O., Myrtaceæ, B.Fl., iii., 225.

A "Scrub Gum."

From its handsome and ornamental leaves, which, being of a more than ordinarily thick and fleshy character, and, therefore, slow to fade, Baron Mueller has suggested this gum as highly suitable for decorative purposes.

South Australia.

19. **Eucalyptus sepulcralis,** *F.v.M.*, N.O., Myrtaceæ, *Eucalyptographia.* (Mueller.)

This tree has a pendulous habit, something like a weeping-willow; hence, Baron Mueller suggests its fitness for cemetery cultivation.

Western Australia.

20. **Euphorbia Drummondii,** *Boiss.*, (Syn. *E. chamæsgee*, Baill.; *E. Ferdinandi*, Baill.; *E. Dallachyana*, Baill.); N.O., Euphorbiaceæ, B.Fl., vi., 49.

It is said the blacks use this Euphorbia for sticking small feathers on native bees, in order that they may be followed to their nests to obtain the honey.

All the colonies.

21. **Ficus glomerata,** *Willd.*, (Syn. *F. vesca*, F.v.M.; *Covellia glomerata*, Miq.); N.O., Urticeæ, B.Fl., vi., 178.

"Clustered Fig."

Bird lime is made in India of the milky juice of this tree.

Queensland and Northern Australia.

22. **Flindersia australis,** *R.Br.*, N.O., Meliaceæ, B.Fl., i., 388.

"Crow's Ash," "Ash," "Beech," "Rasp-pod," and "Flindosa." The aboriginal names on the Richmond and Clarence Rivers are "Wyagerie" and "Cugerie," or "Cudgerie."

A noble tree for avenues. It is also found in the Moluccas, and the natives of those islands use the rough, tuberculated fruits as rasps for preparing roots, etc., for food. *(Treasury of Botany.)* It is very possible the aboriginals here put them to a similar purpose.

Northern New South Wales and Queensland.

23. **Fusanus acuminatus,** *R.Br.*, (Syn. *Santalum acuminatum*, A. DC.; *S. Preissianum*, Miq.; *S. cognatum*, Miq.); N.O., Santalaceæ, B.Fl., vi., 216. *Santalum acuminatum* in Muell. Cens., p. 64.

"Quandong." "Native Peach."

The seeds are used for necklaces, bracelets, and other ornaments.

New South Wales to Western Australia.

24. **Grevillea chrysodendron,** *R.Br.*, (Syn. *G. pteridifolia*, Knight; *G. Mitchellii*, Hook.); N.O., Proteaceæ, B.Fl., v., 434.

The foliage furnishes an elastic stuffing for mattresses. (Bailey.)

Queensland and Northern Australia.

25. **Guettarda speciosa,** *Linn.*, (Syn. *Cadamba jasminiflora*, Sonn.); N.O., Rubiaceæ, B.Fl., iii., 419.

The Fijians make necklaces of the corollas of this plant. (Seemann.)

Queensland and Northern Australia.

26. **Gyrocarpus Jacquini,** *Roxb.*, N.O., Combretaceæ, B.Fl., ii., 505. *G. americanus* in Muell. Cens., p. 51. (For synonyms, see p. 552.)

Necklaces and rosaries are made of the seeds of this tree in India.

Queensland and Northern Australia.

27. **Helichrysum bracteatum,** *Willd.*, (Syn. *H. lucidum*, Henck.; *H. chrysanthum*, Pers.; *H. viscosum*, Sieb.; *H. Banksii*, A. Cunn.; *H. bicolor*, Lindl.; *H. acuminatum*, DC.; *H. macrocephalum*, A. Cunn.; *Xeranthemum bracteatum*, Vent.); N.O., Compositæ, B.Fl., iii., 621.

"Everlasting Flower."

This plant might be cultivated, as the flowers are valuable for funeral wreaths, and other purposes of decoration. This is perhaps the showiest of the genus, but many species are very pretty.

All the colonies.

28. **Ipomæa Pes-capræ,** *Swartz*, N.O., Convolvulaceæ, B.Fl., iv., 419. (For synonyms, see p. 191.)

The leaves are roasted and used for caulking canoes by the natives of Fiji. (Seemann.)

Western Australia, New South Wales to Northern Australia.

29. **Leptospermum lævigatum,** *F.v.M.*, (Syn. *Fabricia lævigata*, Gaertn.; *L. myrtifolia*, Sieb.); N.O., Myrtaceæ, B.Fl., iii., 103.

"Sandstay." "Coast Tea-tree."

This shrub is the most effectual of all for arresting the progress of drift sand in a warm climate. It is most easily raised by simply scattering in autumn the seeds on the sand, and covering them loosely with boughs, or, better still, by spreading lopped-off

branches of the shrub itself, bearing ripe seed, on the sand. (Mueller.)

All the colonies except Western Australia and Queensland.

30. **Malaisia tortuosa,** *Blanco*, (Syn., *M. Cunninghamii*, Planch.; *M. scandens*, Planch.; *M. viridescens*, Planch.; *M. acuminata*, Planch.; *Dumartroya fagifolia*, Gaudich.; *Cephalotropis javanica*, Blume); N.O., Urticeæ, B.Fl., vi., 180.

"Crow Ash."

The fruit, which is ripe and plentiful about Christmas time, forms a good substitute for the holly in decorations. (Bailey.) It is not endemic in Australia.

New South Wales, Queensland and Northern Australia.

31. **Melaleuca ericifolia,** *Smith*, (Syn. *M. nodosa*, Sieb. *non* Smith; *M. Gunniana*, Schau.; *M. heliophila*, F.v.M.); N.O., Myrtaceæ, B.Fl., iii., 159.

This shrub is useful for consolidating muddy shores, as it will live in very salt ground, and in water. It may be easily transplanted whenever it is large. (Mueller.)

All the colonies except Western Australia.

32. **Melaleuca leucadendron,** *Linn.*, N.O., Myrtaceæ, B.Fl., iii., 142. *Melaleuca Leucadendra* in Muell. Cens., p. 55.

"White Tea-tree." "Broad-leaved Tea-tree." "Swamp Tea-tree." "Paper-barked Tea-tree." "Atchoourgo" of the aboriginals of the Mitchell River. (For synonyms, see p. 276.)

Baron Mueller recommends this plant for subduing malarial vapours, as it will grow in salt swamps where no Eucalyptus will live. Its bark protects it against conflagrations.

Western Australia, New South Wales, Queensland and Northern Australia.

33. **Melaleuca Preissiana,** var. **leiostachya,** *Schau.*, (Syn. *M. parviflora*, Lindl.); N.O., Myrtaceæ, B.Fl., iii., 145.

Baron Mueller draws attention to this bush as being useful to stay moving coast sands. Many other species of *Melaleuca* are also useful for this purpose.

All the colonies except Tasmania.

34. **Melaleuca linariifolia,** var. **trichostachya,** *Smith,* (Syn. *M. trichostachya,* Lindl.); N.O., Myrtaceæ, B.Fl., iii., 141. *M. trichostachya* in Muell. Cens., p. 55.

This tree is another of the *Melaleucas* suitable for growing by sea shores, as M. Thozet has seen it growing in places bathed by the tide, and says that large saplings without roots may be transplanted, and will take root.

South Australia, Queensland and Northern Australia.

35. **Piper hederaceum,** *A. Cunn.,* N.O., Piperaceæ, B.Fl., vi., 205.

This climbing plant is considered by a local bee-keeper to be very valuable as a honey yielder.

New South Wales.

36. **Semecarpus Anacardium,** *Linn.;* (Syn., *S. australasicus,* Engl.); N.O., Anacardiaceæ, B.Fl., i., 491.

"Marking-ink Nut Tree" of India.

The unripe fruit, when pounded, is used in India in the formation of a kind of bird lime. *(Treasury of Botany.)* The leaves are used as plates in parts of India.

Queensland and Northern Australia.

37. **Typha angustifolia,** *Linn.,* N.O., Typhaceæ, B.Fl., vii., 159.

"Bullrush."

The spikes of this bullrush, or cat's tail, were collected on the Murray River at one time, and sold for stuffing pillows, etc. This plant is not endemic in Australia.

All the colonies.

38. **Vitis saponaria,** *Seem.;* (Syn., *Cissus geniculata,* A. Gray, non Blume); N.O., Ampelideæ, B.Fl., i., 448.

The natives of Fiji used this creeper for washing their hair to destroy the vermin. The stem, especially the thicker part, is cut in pieces from a foot to eighteen inches long, cooked on hot stones, and when thus rendered quite soft it produces, in water, a rich lather, almost equal to that of soap. (Seemann.)

Queensland.

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MEMORANDUM.

HITHERTO the difficulties in assigning aboriginal names to particular species has been immense. The following are some of the difficulties :—

1. Different people express in different English characters what is obviously the same aboriginal name.

2. In many cases we are in doubt as to the value of an aboriginal's name, *i.e.*, whether it is actually a name for the particular plant alluded to, or an appellation of some characteristic this plant possesses in common with others.

3. Aboriginals are sometimes so very willing to give names to a traveller, that rather than disappoint him they will prepare a few for the occasion.

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